



وزارة التعليم العالي والبحث العلمي  
جهاز الإشراف والتقويم العلمي  
دائرة ضمان الجودة والاعتماد الأكاديمي  
قسم الاعتماد الدولي

**وصف البرنامج الأكاديمي للدراسة الاولى  
لقسم الكيمياء للعام الدراسي  
2025-2024**



## وصف البرنامج الأكاديمي

اسم الجامعة : جامعة بابل

الكلية/المعهد: كلية العلوم للبنات

اسم البرنامج الأكاديمي او المهني : بكالوريوس علوم الكيمياء

اسم الشهادة النهائية : بكالوريوس في الكيمياء

النظام الدراسي : الدراسة الأولية / فصلي + مسار بولونيا

تاريخ اعداد الوصف : 2024/10/8

تاريخ ملء الملف : 2024 /10 /14

التوقيع:

اسم معاون العلمي: أ.د. كوثر محمد علي حسن

التاريخ 2025 / 10 / 14

التوقيع:

اسم رئيس قسم: أ.د. حازم يحيى محمد علي

التاريخ 2024 / 10 / 14

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي : م.د. محمد جواد جادر

التاريخ 2024 / 10 / 14

مصادقه السيد العميد

التاريخ 2024 / 10 / 14





## مقدمة وصف البرنامج الأكاديمي

يهدف برنامج البكالوريوس في قسم الكيمياء إلى إعداد كوادر علمية وبحثية مؤهلة تمتلك قاعدة معرفية متينة في مختلف اختصاصات الكيمياء كالتحليلية ، الفيزيائية ، الحياتية واللاعضوية والعضوية، قادره على النهوض ورفع المستوى العلمي في بلدنا الحبيب مع تركيز خاص على التقنيات المختبرية المتنوعة كالاشعة فوق البنفسجية والاشعة المرئية والفوق بنفسجية وغيرها. يوفر البرنامج للطلبة مزيجاً متكاملًا من الأساسيات النظرية والتدريب العملي المتقدم.

يمتاز البرنامج بوجود مختبرات متطورة مزودة بأحدث الاجهزه، ويعتمد على أسلوب تعلم قائم على المشاريع البحثية العملية، مما يعزز قدرة الطلبة على الابتكار وحل المشكلات العلمية والتقنية المعقدة، ويؤهلهم للانخراط في البحث والتطوير أو العمل في القطاعات المتقدمة.

يخضع المنهج لمراجعة دورية لضمان توافقه مع المعايير الأكاديمية الدولية وتطورات سوق العمل، ويشمل فرص تدريب ميداني ، مما يمنح الخريجين ميزة تنافسية في مجالات العمل أو مواصلة الدراسات العليا في أرقى الجامعات العالمية.

## نموذج وصف البرنامج الأكاديمي

### 1. رؤية البرنامج

أعداد كادر علمي وتقني متخصص بتقنيات التحليلات الكيميائية مع قدره على التعامل وبمهنية عالية مع كافة التقنيات بالتحليلات الكيميائية ومنها التحليلات المهتمة بمعالجة التلوث من المواد والعناصر الكيميائية الثقيلة كالرصاص والزنابق التي تؤثر بحياة المواطنين. كذلك مساهمة القسم بحركة البحوث العلمية و المؤتمرات التعريفية و التطويرية و الاستشارية. تم اعتماد المناهج الموحدة مع اغلب جامعات العراق -قسم الكيمياء لغرض سهوله التنقل بين الجاوعات اضافاه للاستفادة العلمية منها ، مع مراعاة متطلبات الكلية ككلية علمية .

### 2. رسالة البرنامج

يسعى قسم الكيمياء في كلية العلوم للبنات ، وتكاملا" مع رسالة الكلية في تلبية حاجات المجتمع من الكوادر المختصة في الكيمياء كالتحليلات المرضية واستخدام التقنيات الحديثة في مجال تحليل العناصر السامه وغير السامه في كافة التطبيقات العلمية والعملية خاصة في المجال الطبي والصناعي وما تطلبه ذلك من تهيئة الكوادر البحثية المتخصصة للعمل في هذا المجال ولماكبة اخر التطورات فيه.

تحقيقا لرؤيا كلية العلوم للبنات و للقيام بدورها الريادي لتبوء مكانة علمية مرموقة بين الكليات المحلية و العربية و الأجنبية يسعى قسم الكيمياء إلى نشر و ترسيخ أحدث المعلومات عن الكيمياء في المجتمع العراقي لمواكبة التطور الهائل الذي تحقق خلال العقود الثلاثة الأخيرة في هذا المضمار وعلى كافة الأصعدة من النانو تكنولوجي و حتى الفضاء الخارجي .

### 3. اهداف البرنامج

1. إعداد كوادر كفوة في مجال علوم الكيمياء

2. المساهمة في تطوير الكوادر العاملة في مجال علوم الكيمياء في القطاعات المختلفة كصناعة الاسمدة والزيوت والالبان .

3. تطوير منظومة العمل في مجال اختصاص الكيمياء

4. نشر الوعي العلمي في مجال الكيمياء

5. احتساب العمل في المجال الصناعي ذو العلاقة بالكيمياء بموجب مواصفة الايزو

#### 4. الاعتماد البرامجي

لا يوجد

#### 5. المؤثرات الخارجية الاخرى

لا يوجد

#### 6. هيكلية البرنامج

| هيكلية البرنامج | عدد المقررات | وحدة دراسية | النسبة مئوية | الملاحظات |
|-----------------|--------------|-------------|--------------|-----------|
| متطلبات المؤسسة | 13           | 19          | 13.57%       | اساسي     |
| متطلبات الكلية  | 2            | 4           | 2.85%        | اساسي     |
| متطلبات القسم   | 46           | 117         | 83.57%       | اساسي     |
| التدريب الصيفي  | لا يوجد      | لا يوجد     | /            | /         |

#### 7. وصف البرنامج

| السنة / المستوى | رمز المقرر او المساق | اسم المقرر او المساق | الساعات المعتمدة |      |
|-----------------|----------------------|----------------------|------------------|------|
|                 |                      |                      | نظري             | عملي |



## المرحلة الاولى

|       |         |           | Republic of Iraq - Ministry of Higher Education and Scientific Research<br>University of Babylon<br>Bachelor's degree in chemistry science (First cycle)<br>Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr<br>Program Curriculum (2024 - 2025) |                               |                       |          | جمهورية العراق - وزارة التعليم العالي والبحث العلمي<br>جامعة بابل<br>بكالوريوس في علوم الكيمياء (الدورة الأولى)<br>أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة<br>المنهاج الدراسي للعام ٢٠٢٤-٢٠٢٥ |     |        |           |  |            |                    |                        |                         |                   |       |                 |                                |           |
|-------|---------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------|-----------|-------------------------------------------------------------------------------------|------------|--------------------|------------------------|-------------------------|-------------------|-------|-----------------|--------------------------------|-----------|
| Level | Semeste | No.       | Module Code                                                                                                                                                                                                                                                      | Module Name in English        | اسم المادة الدراسية   | Language | SSWL (hr/w)                                                                                                                                                                                                                            |     |        |           |                                                                                     |            | Exam<br>hr/se<br>m | SSW<br>L<br>hr/se<br>m | USSW<br>L<br>hr/se<br>m | SWL<br>hr/se<br>m | ECTS  | Modul<br>e Type | Prerequisite<br>Module(s) Code |           |
|       |         |           |                                                                                                                                                                                                                                                                  |                               |                       |          | CL (hr/w)                                                                                                                                                                                                                              | ect | (hr/v) | ab (hr/v) | Pr (hr/v)                                                                           | Tut (hr/w) |                    |                        |                         |                   |       |                 |                                | em (hr/v) |
| One   | 1       | CHEM1111  | Qualitative Analysis Chemistry                                                                                                                                                                                                                                   | كيمياء التحليل النوعي         | English               | 2        | 0                                                                                                                                                                                                                                      | 2   | 0      | 0         | 0                                                                                   | 0          | 3                  | 63                     | 137                     | 200               | 8.00  | C               |                                |           |
|       | 2       | CHEM1112  | Inorganic1                                                                                                                                                                                                                                                       | اللاعضوية ١                   | English               | 2        | 0                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 3                  | 33                     | 142                     | 175               | 7.00  | C               |                                |           |
|       | 3       | CHEM1103  | Cytology                                                                                                                                                                                                                                                         | علم الخلية                    | English               | 2        | 0                                                                                                                                                                                                                                      | 2   | 0      | 0         | 0                                                                                   | 0          | 3                  | 63                     | 87                      | 150               | 6.00  | S               |                                |           |
|       | 4       | CHEM1104  | Labortary Safty                                                                                                                                                                                                                                                  | السلامة والأمن الكيميائي      | English               | 2        | 0                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 3                  | 33                     | 92                      | 125               | 5.00  | S               |                                |           |
|       | 5       | UOBAB1104 | Human and Democracy                                                                                                                                                                                                                                              | حقوق الإنسان والديمقراطية     | Arabic                | 2        | 0                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 3                  | 33                     | 17                      | 50                | 2.00  | B               |                                |           |
|       | 6       | UOBAB1102 | Arabic Language                                                                                                                                                                                                                                                  | اللغة العربية                 | Arabic                | 2        | 0                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 3                  | 33                     | 17                      | 50                | 2.00  | B               |                                |           |
| Total |         |           |                                                                                                                                                                                                                                                                  |                               |                       | 12       | 0                                                                                                                                                                                                                                      | 4   | 0      | 0         | 0                                                                                   | 0          | 18                 | 258                    | 492                     | 750               | 30.00 |                 |                                |           |
| UGI   | Two     | 1         | CHEM1201                                                                                                                                                                                                                                                         | Volumetric Analysis Chemistry | كيمياء التحليل الحجمي | English  | 2                                                                                                                                                                                                                                      | 0   | 2      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 63                      | 137               | 200   | 8.00            | C                              | CHEM1111  |
|       |         | 2         | CHEM1202                                                                                                                                                                                                                                                         | Inorganic 2                   | اللاعضوية ٢           | English  | 2                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 33                      | 142               | 175   | 7.00            | C                              | CHEM1112  |
|       |         | 3         | CHEM1203                                                                                                                                                                                                                                                         | Mathematics I                 | رياضيات I             | English  | 2                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 33                      | 67                | 100   | 4.00            | S                              |           |
|       |         | 4         | CHEM1204                                                                                                                                                                                                                                                         | Physics Science               | الفيزياء              | English  | 2                                                                                                                                                                                                                                      | 0   | 2      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 63                      | 87                | 150   | 6.00            | S                              |           |
|       |         | 5         | UOBABb4                                                                                                                                                                                                                                                          | Computer I                    | حاسوب I               | Arabic   | 2                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 33                      | 42                | 75    | 3.00            | B                              |           |
|       |         | 6         | UOBABb1101                                                                                                                                                                                                                                                       | English Language I            | لغة الانكليزية I      | English  | 2                                                                                                                                                                                                                                      | 0   | 0      | 0         | 0                                                                                   | 0          | 0                  | 3                      | 33                      | 17                | 50    | 2.00            | B                              |           |
| Total |         |           |                                                                                                                                                                                                                                                                  |                               |                       | 12       | 0                                                                                                                                                                                                                                      | 4   | 0      | 0         | 0                                                                                   | 0          | 18                 | 258                    | 492                     | 750               | 30.00 |                 |                                |           |

## المرحلة الثانية

| Republic of Iraq - Ministry of Higher Education and Scientific Research<br>University of Babylon<br>Bachelor's degree in chemistry science (First cycle)<br>Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr<br>Program Curriculum (2024 - 2025) |          |           |                 |                                     |                          | جمهورية العراق - وزارة التعليم العالي والبحث العلمي<br>جامعة بابل<br>بكالوريوس في علوم الكيمياء (الدورة الأولى)<br>أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة<br>المنهاج الدراسي للعام ٢٠٢٤-٢٠٢٥ |             |             |            |           |            |            |             |             |              |  |      |             |                             |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|-----------------|-------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------|-----------|------------|------------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|------|-------------|-----------------------------|----------|
| Level                                                                                                                                                                                                                                                            | Semester | No.       | Module Code     | Module Name in English              | اسم المادة الدراسية      | Language                                                                                                                                                                                                                               | SSWL (hr/w) |             |            |           |            |            | Exam hr/sem | SSWL hr/sem | USSWL hr/sem | SWL hr/sem                                                                            | ECTS | Module Type | Prerequisite Module(s) Code |          |
|                                                                                                                                                                                                                                                                  |          |           |                 |                                     |                          |                                                                                                                                                                                                                                        | CL (hr/w)   | Lect (hr/w) | Lab (hr/w) | Pr (hr/w) | Tut (hr/w) | Sem (hr/w) |             |             |              |                                                                                       |      |             |                             |          |
|                                                                                                                                                                                                                                                                  | One      | 1         | CHEM2311        | Chemistry of represented elements 1 | كيمياء العناصر الممثلة ١ | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           |          |
|                                                                                                                                                                                                                                                                  |          | 2         | CHEM2302        | Gravimetric analysis                | التحليل الوزني           | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           |          |
|                                                                                                                                                                                                                                                                  |          | 3         | CHEM2313        | Thermodynamics1                     | الديناميكية الحرارية ١   | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           |          |
|                                                                                                                                                                                                                                                                  |          | 4         | CHEM2314        | Organic Chemistry1                  | الكيمياء العضوية ١       | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           |          |
|                                                                                                                                                                                                                                                                  |          | 5         | CHEM2305        | Differential equations              | المعادلات التفاضلية      | English                                                                                                                                                                                                                                | 2           | 0           | 0          | 0         | 0          | 0          | 0           | 3           | 33           | 42                                                                                    | 75   | 3.00        | S                           |          |
|                                                                                                                                                                                                                                                                  |          | 6         |                 | Computer 2                          | الحاسوب ٢                | English                                                                                                                                                                                                                                | 2           | 0           | 0          | 0         | 0          | 0          | 0           | 3           | 33           | 42                                                                                    | 75   | 3.00        | S                           |          |
|                                                                                                                                                                                                                                                                  |          |           |                 |                                     |                          |                                                                                                                                                                                                                                        |             | Total       | 12         | 0         | 8          | 0          | 0           | 0           | 18           | 318                                                                                   | 432  | 750         | 30.00                       |          |
| UGI                                                                                                                                                                                                                                                              | Two      | 1         | CHEM2401        | Chemistry of represented elements 2 | كيمياء العناصر الممثلة ٢ | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           | CHEM2311 |
|                                                                                                                                                                                                                                                                  |          | 2         | CHEM2402        | Separation Methods                  | طرق الفصل                | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           |          |
|                                                                                                                                                                                                                                                                  |          | 3         | CHEM2403        | Thermodynamics 2                    | الديناميكية الحرارية ٢   | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           | CHEM2313 |
|                                                                                                                                                                                                                                                                  |          | 4         | CHEM2404        | Organic Chemistry 2                 | الكيمياء العضوية ٢       | English                                                                                                                                                                                                                                | 2           | 0           | 2          | 0         | 0          | 0          | 0           | 3           | 63           | 87                                                                                    | 150  | 6.00        | C                           | CHEM2314 |
|                                                                                                                                                                                                                                                                  |          | 5         | UOBAB2301       | Baath Party crimes                  | جرائم البعث البائد       | Arabic                                                                                                                                                                                                                                 | 2           | 0           | 0          | 0         | 0          | 0          | 0           | 3           | 33           | 17                                                                                    | 50   | 2.00        | S                           |          |
|                                                                                                                                                                                                                                                                  |          |           | UOBAB2302       | English LanguageII                  | اللغة الإنكليزية II      | English                                                                                                                                                                                                                                | 2           | 0           | 0          | 0         | 0          | 0          | 0           | 3           | 33           | 17                                                                                    | 50   | 2.00        | S                           |          |
|                                                                                                                                                                                                                                                                  |          | UOBAB1102 | Arabic Language | اللغة العربية                       | Arabic                   | 2                                                                                                                                                                                                                                      | 0           | 0           | 0          | 0         | 0          | 0          | 3           | 33          | 17           | 50                                                                                    | 2.00 | B           |                             |          |
|                                                                                                                                                                                                                                                                  |          |           |                 |                                     |                          |                                                                                                                                                                                                                                        | Total       | 12          | 0          | 8         | 0          | 0          | 0           | 18          | 318          | 432                                                                                   | 750  | 30.00       |                             |          |

## المرحلة الثالثة :

المواد الدراسية وتحدد الوحدات للمرحلة الثالثة لقسم الكيمياء - كلية العلوم للينقات - جامعة بابل للعام الدراسي 2024 - 2025

### المرحلة الثالثة- الفصل الاول

| تعدد الوحدات | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية | اسم المادة باللغة العربية |
|--------------|-------------------|------|------------------------------|---------------------------|
|              | تعملي             | نظري |                              |                           |
| 3            | 2                 | 2    | Physical Chemistry-1         | الكيمياء الفيزيائية-1     |
| 3            | 2                 | 2    | Organic Chemistry-1          | الكيمياء العضوية-1        |
| 3            | 2                 | 2    | Inorganic Chemistry-1        | الكيمياء اللاعضوية-1      |
| 3            | 2                 | 2    | Biochemistry-1               | الكيمياء الحياتية-1       |
| 2            | -                 | 2    | Industrial Chemistry-1       | الكيمياء الصناعية-1       |
| 2            | -                 | 2    | Environmental                | البيئة                    |
| 2            | -                 | 2    | English Language-3           | اللغة الانكليزية-3        |

### المرحلة الثالثة / الفصل الثاني

| تعدد الوحدات | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية | اسم المادة باللغة العربية |
|--------------|-------------------|------|------------------------------|---------------------------|
|              | تعملي             | نظري |                              |                           |
| 3            | 2                 | 2    | Physical Chemistry-2         | الكيمياء الفيزيائية-2     |
| 3            | 2                 | 2    | Organic Chemistry-2          | الكيمياء العضوية-2        |
| 3            | 2                 | 2    | Inorganic Chemistry-2        | الكيمياء اللاعضوية-2      |
| 3            | 2                 | 2    | Biochemistry-2               | الكيمياء الحياتية-2       |
| 2            | -                 | 2    | Industrial Chemistry-2       | الكيمياء الصناعية-2       |
| 2            | -                 | 2    | Nanotechnology               | تأوتكتولوجي               |

## المرحلة الرابعة :

المواد الدراسية وعدد الوحدات للمرحلة الرابعة لقسم الكيمياء – كلية العلوم للبنات – جامعة بابل للعام الدراسي 2024 – 2025

| المرحلة الرابعة - الفصل الاول |                   |      |                                     |                               |
|-------------------------------|-------------------|------|-------------------------------------|-------------------------------|
| عدد الوحدات                   | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية        | اسم المادة باللغة العربية     |
|                               | نظري              | عملي |                                     |                               |
| 3                             | 2                 | 2    | Instrumental analysis -1            | التحليل الالي-1               |
| 2                             | -                 | 2    | Quantum Chemistry                   | كيمياء الكم                   |
| 3                             | 2                 | 2    | Industrial Chemistry-1              | الكيمياء الصناعية-1           |
| 3                             | 2                 | 2    | Bio clinical chemistry-1            | الكيمياء الحياتية السريرية- 1 |
| 2                             | -                 | 2    | Heterocyclic                        | حلقية غير متجانسة             |
| 2                             | -                 | 2    | English Language-4                  | اللغة الانكليزية-4            |
| 2                             | -                 | 2    | Research project                    | مشروع بحث                     |
| المرحلة الرابعة /الفصل الثاني |                   |      |                                     |                               |
| عدد الوحدات                   | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية        | اسم المادة باللغة العربية     |
|                               | نظري              | عملي |                                     |                               |
| 3                             | 2                 | 2    | Instrumental analysis -2            | التحليل الالي-2               |
| 2                             | -                 | 2    | Spectroscopy                        | الاطياف                       |
| 3                             | 2                 | 2    | Industrial Chemistry-2              | الكيمياء الصناعية-2           |
| 3                             | 2                 | 2    | Bio clinical chemistry-2            | الكيمياء الحياتية السريرية- 2 |
| 2                             | -                 | 2    | Photochemistry                      | كيمياء الضوء                  |
| 4                             | 6                 | 2    | Identification of organic chemistry | كيمياء التشخيص العضوي         |

## 8.مخرجات التعلم المتوقعة للبرنامج

### المعرفة

1. أن يتعرف الطالب على مفهوم الكيمياء
  2. أن يصنف الاحتياجات لتطوير الكيمياء
  3. أن يفصل المواصفة الكيميائية حسب نظام الايزو
  4. أن يقيم كلفة صيانة معدات التصنيع الكيميائي
- المعرفة والفهم



## المهارات

|                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <p>1. معرفة الطالب لمفهوم الكيمياء</p> <p>2. أهمية الكيمياء في مجالات الحياة</p> <p>3. تمكين الطالبات من تحاليل تكاليف العمل في مجال الصناعات الكيميائية</p>                                                                                                                                                                                                                                                                   | المهارات الخاصة بالموضوع |
| <p>1. مهارة التفكير حسب قدرة الطالب (الهدف من هذه المهارة هو أن يعتقد الطالب بما هو ملموس ( قدرات الطالب) وفهم متى وماذا وكيف يجب أن يفكر ويعمل على تحسين القدرة على التفكير بشكل معقول )</p> <p>2. مهارة التفكير العالية ( الهدف من هذه المهارة هو تعليم التفكير جيدا قبل يتخذ القرار الذي يحدد حياة الطالب )</p> <p>3. مهارات التفكير الناقد (هي مصطلح يرمز لأعلى مستويات التفكير والتي يهدف إلى طرح مشكلة ما ثم تحليلها</p> | مهارات التفكير           |

## القيـم

|                                                                                                                                                                                                  |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <p>Exams -1</p> <p>Learning Matrix -2 ( مصفوفة التعلم )</p> <p>Which Face -3 ( طريقة التعبير بالوجوه)</p> <p>CAT -4 ( التغذية الراجعة من الطلاب )</p> <p>Learning Triangle -5 (مثلث التعلم )</p> | طرائق التقييم |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|

## 9. استراتيجيات التعليم والتعلم

### استراتيجيات التعلم

- 1-استراتيجية التفكير حسب قدرة الطالب ( مثال : إذا استطاع الطالب أن يتعلم مفهوم الادارة الصحيح يكتسب مهارة إدارة وتنظيم حياته الشخصية) .
- 2-استراتيجية مهارة التفكير العالية (مثال اذا كان الطالب يرغب في اتخاذ قرار جيد، من المهم أن يفكر جيدا قبل أن يتخذ القرار و إذا قرر دون تفكير أو إذا كان لا يستطيع التفكير جيدا أو إذا كان لا يستطيع أن يقرر أو

ربما لن يقرر فهذا يعني ليس لديه مهارة التفكير العالية).

- 3- استراتيجيات التفكير الناقد في التعلم (Critical Thinking) (هي مصطلح يرمز لأعلى مستويات التفكير والتي يهدف إلى طرح مشكلة ما ثم تحليلها منطقياً للوصول إلى الحل المطلوب).
- 4- العصف الذهني.

### طرائق التعليم والتعلم

- 1- طريقة القاء المحاضرات .
- 2- Student Center
- 3- ( المجاميع الطلابية Team Project )
- 4- ( Work shop ورش العمل )
- 5- ( الرحلات العلمية لمتابعة الواقع البيئي )
- 6- ( Learning Technologies on Campus التعلم الالكتروني داخل الحرم الجامعي )
- 7- ( experiential learning التعلم التجريبي )
- 8- ( Application Learning تطبيق التعليم )

### 10. طرائق التقييم

- 1- Exams
- 2- Matrix ( مصفوفة التعلم )
- 3- Which Face ( طريقة التعبير بالوجه )
- 4- CAT ( التغذية الراجعة من الطلاب )
- 5- Learning Triangle (مثلث التعلم )

## 11. الهيئة التدريسية

### اعضاء هيئة التدريس

| الرتبة العلمية |                         | اسم التدريسي | التخصص               |       | المتطلبات/المهارات الخاصة (ان وجدت) | اعداد الهيئة التدريسية |  |
|----------------|-------------------------|--------------|----------------------|-------|-------------------------------------|------------------------|--|
| العام          | الدقيق                  |              | ملاك                 | محاضر |                                     |                        |  |
| استاذ          | د.حازم يحيى محمد علي    | الكيمياء     | كيمياء فيزيائيه      |       | √                                   |                        |  |
| استاذ          | د.اياد فاضل محمد        | الكيمياء     | كيمياء فيزيائيه      |       | √                                   |                        |  |
| استاذ          | د.محمد حامد سعيد        | الكيمياء     | كيمياء لاعضويه       |       | √                                   |                        |  |
| استاذ          | د. طلعت طارق خليل       | الكيمياء     | كيمياء حياتيه        |       | √                                   |                        |  |
| استاذ          | د. صادق عبد الحسين كريم | الكيمياء     | كيمياء عضويه/ بوليمر |       | √                                   |                        |  |
| استاذ          | د.فؤاد فاضل محمد        | الكيمياء     | كيمياء تحليليه       |       | √                                   |                        |  |
| استاذ          | د. اسيل مشتاق كاظم      | الكيمياء     | كيمياء تحليليه       |       | √                                   |                        |  |
| استاذ مساعد    | د.نور عبد الرزاق        | الكيمياء     | كيمياء عضويه         |       | √                                   |                        |  |
| استاذ مساعد    | د.سعاد طه سعد           | الكيمياء     | كيمياء لاعضويه       |       | √                                   |                        |  |
| استاذ مساعد    | د.احمد حسن شنتاف        | الكيمياء     | كيمياء عضويه         |       | √                                   |                        |  |
| استاذ مساعد    | د.علي طالب بدر          | الكيمياء     | كيمياء لاعضويه       |       | √                                   |                        |  |

|             |                    |          |                 |   |  |
|-------------|--------------------|----------|-----------------|---|--|
| استاذ مساعد | د. زينب هاشم خضير  | الكيمياء | كيمياء تحليليه  | √ |  |
| استاذ مساعد | د. زياد عمران موسى | الكيمياء | كيمياء عضويه    | √ |  |
| مدرس        | محمد عيدان حسن     | الكيمياء | كيمياء تحليليه  | √ |  |
| مدرس        | علي محسن محمد      | الكيمياء | كيمياء فيزياويه | √ |  |
| مدرس        | شيرين حمزه عباس    | الكيمياء | كيمياء حياتيه   | √ |  |
| مدرس مساعد  | رنا صلاح نوري      | الكيمياء | كيمياء حياتيه   | √ |  |

## التطوير المهني

### توجيه اعضاء هيئة التدريس الجدد

التدريس كأى فن اخر يمكن اكتسابه من خلال ممارسة وأتباع طرقه وأصوله بشرط الرغبة الصادقة مزاوله مهنة التدريس والطريقة في التربية تعني اتخاذ خطوات مترابطة للوصول الى هدف معين ترجى تحقيقه. لذلك يجب ان يتبع المبادئ الاساسية في التدريس الجيد والتي هي:

1- توجيه المتعلمين وارشادهم عن طريق خلق مواقف تعليمية تؤدي إلى فعاليات مرغوبة فيها.  
2- توفير جو من المحبة والعطف والتعاون بين المعلم والمتعلمين وبين المتعلمين أنفسهم من خلال حبه لطلبته تمييز وعدم الأكتثار من التأنيث.

3- اعتماد القيادة الديمقراطية من خلال العلاقة الحسية بين المدرس وطلبته مما يقودهم الى الضبط المبني على الاحترام المتبادل وخلق جو تعاوني بين الطلبة وبين المدرس وطلبته.

## التطوير المهني لأعضاء هيئة التدريس

- 1- استراتيجيات التفكير حسب قدرة الطالب ( مثال : إذا استطاع الطالب أن يتعلم مفهوم الادارة الصحيح يكتسب مهارة إدارة وتنظيم حياته الشخصية) . و استراتيجيات مهارة التفكير العالية (مثال اذا كان الطالب يرغب في اتخاذ قرار جيد، من المهم أن يفكر جيدا قبل أن يتخذ القرار و إذا قرر دون تفكير أو إذا كان لا يستطيع التفكير جيدا أو إذا كان لا يستطيع أن يقرر أو ربما لن يقرر فهذا يعني ليس لديه مهارة التفكير العالية).
- 2- المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).
- 3- التواصل اللفظي .
- 4- العمل الجماعي.
- 5- تحليل والتحقيق (جمع المعلومات بشكل منهجي وعلمي لتأسيس الحقائق والمبادئ حل المشكلة).
- 6- مبادرة (الدافعية على العمل والقدرة على المبادرة، وتحديد الفرص و وضع الأفكار والحلول المطروحة.

## 12. معيار القبول

قبول مركزي وقبول موازي

## 13. أهم مصادر المعلومات عن البرنامج

- 1- الموقع الالكتروني للكلية والجامعة.

<https://csg.uobabylon.edu.iq/>

<https://csg.uobabylon.edu.iq/department/?cdid=4>

[https://csg.uobabylon.edu.iq/department/dep\\_lectures.aspx?cdid=4](https://csg.uobabylon.edu.iq/department/dep_lectures.aspx?cdid=4)

- 2- دليل الجامعة . <https://systems.uobabylon.edu.iq/>

- 3- أهم الكتب والمصادر الخاصة بمكتبة الكلية.



#### 14. خطة تطوير البرنامج

تم تطبيق مسار بولونيا على طلبة المرحلة الاولى والعمل على تطبيقه على المراحل القادمة مع عمل ورش عمل وسمنارات لتعريف اعضاء الهيئة التدريسية على متطلبات مسار بولونيا وكيفية العمل به ومناقشة السلبيات والمعوقات وايجاد الحلول لها. تم تطبيق النظام الالكتروني في عملية التعليم .

## مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج                                                              |    |    |    |                |    |    |    |                             |    |    |    |                |    |    |    |                     |                              |            |                                  |
|-------------------------------------------------------------------------------------------------|----|----|----|----------------|----|----|----|-----------------------------|----|----|----|----------------|----|----|----|---------------------|------------------------------|------------|----------------------------------|
| المهارات العامة والمنقولة<br>(أو) المهارات الأخرى<br>المتعلقة بقابلية التوظيف<br>والتطور الشخصي |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة<br>بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام<br>اختياري | اسم المقرر                   | رمز المقرر | السنة / المستوى                  |
| 4د                                                                                              | 3د | 2د | 1د | 4ج             | 3ج | 2ج | 1ج | 4ب                          | 3ب | 2ب | 1ب | 4أ             | 3أ | 2أ | 1أ |                     |                              |            |                                  |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | كيمياء التحليل النوعي        |            | المرحلة الاولى<br>(الكورس الاول) |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | اللاعضوية-1                  |            |                                  |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | علم الخليه                   |            |                                  |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | السلامه والامن الكيماوي      |            |                                  |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | حقوق الانسان<br>والديمقراطيه |            |                                  |
| *                                                                                               | *  | *  | *  | *              | *  | *  | *  | *                           | *  | *  | *  | *              | *  | *  | *  | اساسي               | اللغة العربيه                |            |                                  |

مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج                           |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                       |            |                                   |
|--------------------------------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|-----------------------|------------|-----------------------------------|
| المهارات العامة والمنقولة                                    |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر            | رمز المقرر | السنة / المستوى                   |
| (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي | 1د | 2د | 3د | 4د             | 1ج | 2ج | 3ج | 4ج                       | 1ب | 2ب | 3ب | 4ب             | 1أ | 2أ | 3أ | 4أ               |                       |            |                                   |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | خواص المواد           |            | المرحلة الاولى<br>(الكورس الثاني) |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | كيمياء التحليل الحجمي |            |                                   |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | اللاعضوية-2           |            |                                   |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الرياضيات             |            |                                   |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الفيزياء              |            |                                   |
| *                                                            | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | برمجة الحاسوب         |            |                                   |

مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج |            |                         |                  |                |    |    |    |                          |    |    |    |                |    |    |    |                           |    |                                                              |    |
|------------------------------------|------------|-------------------------|------------------|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|---------------------------|----|--------------------------------------------------------------|----|
| السنة / المستوى                    | رمز المقرر | اسم المقرر              | اساسي ام اختياري | المعرفة والفهم |    |    |    | المهارات الخاصة بالموضوع |    |    |    | مهارات التفكير |    |    |    | المهارات العامة والمنقولة |    | (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي |    |
|                                    |            |                         |                  | أ1             | أ2 | أ3 | أ4 | ب1                       | ب2 | ب3 | ب4 | ج1             | ج2 | ج3 | ج4 | د1                        | د2 | د3                                                           | د4 |
| المرحلة الثانية<br>(الكورس الاول)  |            | كيمياء العناصر الممثلة1 | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | التحليل الوزني          | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | الدينامية الحرارية1     | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | الكيمياء العضوية-1      | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | المعادلات التفاضليه     | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | الحاسوب-2               | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            | جرائم حزب البعث         | اساسي            | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | *                         | *  | *                                                            | *  |
|                                    |            |                         |                  |                |    |    |    |                          |    |    |    |                |    |    |    |                           |    |                                                              |    |

## مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج                           |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                          |            |                                 |
|--------------------------------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|--------------------------|------------|---------------------------------|
| المهارات العامة والمنقولة                                    |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر               | رمز المقرر | السنة / المستوى                 |
| (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي | 1د | 2د | 3د | 4د             | 1ج | 2ج | 3ج | 4ج                       | 1ب | 2ب | 3ب | 4ب             | 1أ | 2أ | 3أ | 4أ               |                          |            |                                 |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | كيمياء العناصر الممثلة 2 |            | المرحلة الثانية (الكورس الثاني) |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | طرق الفصل                |            |                                 |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الدينمية الحرارية 2      |            |                                 |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء العضوية-2       |            |                                 |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الحاسوب-3                |            |                                 |
|                                                              | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | اللغة الانكليزية-2       |            |                                 |
|                                                              |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                          |            |                                 |
|                                                              |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                          |            |                                 |

مخطط مهارات المنهج

يرجى وضع إشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

مخرجات التعلم المطلوبة من البرنامج

| المهارات العامة والمنقولة<br>(أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر            | رمز المقرر | السنة / المستوى                   |
|-------------------------------------------------------------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|-----------------------|------------|-----------------------------------|
| د4                                                                                        | د3 | د2 | د1 | ج4             | ج3 | ج2 | ج1 | ب4                       | ب3 | ب2 | ب1 | أ4             | أ3 | أ2 | أ1 |                  |                       |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الفيزيائية-1 |            | المرحلة الثالثة<br>(الكورس الاول) |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء العضوية-1    |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء اللاعضوية-1  |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الحياتية-1   |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الصناعية-1   |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | البيئة                |            |                                   |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | اللغة الانكليزية-3    |            |                                   |



مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج                                                        |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                       |            |                                    |
|-------------------------------------------------------------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|-----------------------|------------|------------------------------------|
| المهارات العامة والمنقولة<br>(أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر            | رمز المقرر | السنة / المستوى                    |
| د4                                                                                        | د3 | د2 | د1 | ج4             | ج3 | ج2 | ج1 | ب4                       | ب3 | ب2 | ب1 | أ4             | أ3 | أ2 | أ1 |                  |                       |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الفيزيائية-2 |            | المرحلة الثالثة<br>(الكورس الثاني) |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء العضوية-2    |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء اللاعضوية-2  |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الحياتية- 2  |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الصناعية-2   |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | نانوتكنولوجي          |            |                                    |

مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                              |            |                                   |
|------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|------------------------------|------------|-----------------------------------|
| المهارات العامة والمنقولة          |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر                   | رمز المقرر | السنة / المستوى                   |
| 1د                                 | 2د | 3د | 4د | 1ج             | 2ج | 3ج | 4ج | 1ب                       | 2ب | 3ب | 4ب | 1أ             | 2أ | 3أ | 4أ |                  |                              |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | التحليل الالي-1              |            | المرحلة الرابعة<br>(الكورس الاول) |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | كيمياء الكم                  |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الصناعية-1          |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الحياتية السريرية-1 |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | حلقية غير متجانسة            |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | اللغة الانكليزية-4           |            |                                   |
| *                                  | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | مشروع بحث                    |            |                                   |
|                                    |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                              |            |                                   |

مخطط مهارات المنهج

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

| مخرجات التعلم المطلوبة من البرنامج                                                        |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                              |            |                                    |
|-------------------------------------------------------------------------------------------|----|----|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|------------------|------------------------------|------------|------------------------------------|
| المهارات العامة والمنقولة<br>(أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي |    |    |    | مهارات التفكير |    |    |    | المهارات الخاصة بالموضوع |    |    |    | المعرفة والفهم |    |    |    | اساسي ام اختياري | اسم المقرر                   | رمز المقرر | السنة / المستوى                    |
| د4                                                                                        | د3 | د2 | د1 | ج4             | ج3 | ج2 | ج1 | ب4                       | ب3 | ب2 | ب1 | أ4             | أ3 | أ2 | أ1 |                  |                              |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | التحليل الالي-2              |            | المرحلة الرابعة<br>(الكورس الثاني) |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الاطياف                      |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الصناعية-2          |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | الكيمياء الحياتية السريرية-2 |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | كيمياء الضوء                 |            |                                    |
| *                                                                                         | *  | *  | *  | *              | *  | *  | *  | *                        | *  | *  | *  | *              | *  | *  | *  | اساسي            | تشخيص عضوي                   |            |                                    |
|                                                                                           |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                              |            |                                    |
|                                                                                           |    |    |    |                |    |    |    |                          |    |    |    |                |    |    |    |                  |                              |            |                                    |



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Chemistry



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                 |                               |                                                              |       |
|-----------------------------|-----------------|-------------------------------|--------------------------------------------------------------|-------|
| معلومات المادة الدراسية     |                 |                               |                                                              |       |
| Module Title                | Bio Chemistry-1 |                               | Module Delivery                                              |       |
| Module Type                 | C               |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |       |
| Module Code                 |                 |                               |                                                              |       |
| ECTS Credits                | 3.00            |                               |                                                              |       |
| SWL (hr/sem)                | 150             |                               |                                                              |       |
| Module Level                |                 | Semester of Delivery          |                                                              |       |
| Administering Department    |                 | College                       |                                                              |       |
| Module Leader               | Talat Tariq     |                               | e-mail                                                       |       |
| Module Leader's Acad. Title | Prof.           | Module Leader's Qualification |                                                              | Ph.D. |
| Module Tutor                |                 |                               | e-mail                                                       | None  |
| Peer Reviewer Name          |                 |                               | e-mail                                                       |       |
| Review Committee Approval   |                 |                               | Version Number                                               | 1.0   |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                        | <p>The course aims to:</p> <ol style="list-style-type: none"> <li>1- Presentation of organic chemical compounds such as carbohydrates, lipids, vitamins, nucleotides, and nucleic acids.</li> <li>2- Presenting the chemical structures of organic compounds in the living cell.</li> <li>3- Explaining the reactions of oxidation, reduction, transport, neutralization, and hydrolysis that take place in the living cell with the help of enzymes.</li> <li>4- Preparing the student to know the biological importance of nucleotides, DNA, and RNA</li> <li>5- Discussing the properties of water and its role in living cells.</li> <li>6- Knowing the importance of biochemistry in applied fields.</li> </ol> |          |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                   | <ol style="list-style-type: none"> <li>1. It is well known that Biochemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</li> <li>2. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</li> <li>3. Students can handle the chemicals with good experience.</li> </ol>                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                  | <ol style="list-style-type: none"> <li>1. Biochemistry is one of the scientific subjects of great importance in learning about the chemical reactions that take place in the living cells of living organisms, through which you learn about the nature of these reactions, which include the corresponding oxidation, reduction, transport, and hydrolysis reactions, which involve five thousand enzymes that can transform the basic substances (the reactants ) into</li> </ol>                                                                                                                                                                                                                                  |          |  |

|                                                                               |                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | products over a period of time sometimes estimated at nanoseconds. We also learn through this course about carbohydrates, fats, and vitamins, which are one of the biochemical components of the foods that we eat daily in our food. |
| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                       |
| <b>Strategies</b>                                                             |                                                                                                                                                                                                                                       |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>                   |     |                                                                            |    |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                            |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الأسبوعي النظري</b> |                         |
|--------------------------------------------------------------------------|-------------------------|
|                                                                          | <b>Material Covered</b> |

|                |                                                                                                                                                                                                              |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>• Introduction, general introduction, directions and guidelines.</li> </ul>                                                                                           |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>• Molecules and life The origin of living molecules Large molecules Building large complexes Models of living cells Properties and functions of cell parts</li> </ul> |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>• Water and solutions, properties of water, carbohydrates, their importance,</li> <li>• .</li> </ul>                                                                  |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>• definition and classification, monosaccharides, disaccharides, polysaccharides,.</li> <li>•</li> </ul>                                                              |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>• derived sugars, acidic sugars, alcoholic sugars, mucosaccharides, chemical reactions</li> </ul>                                                                     |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>• Amino acids, their definition, protein amino acids,.</li> </ul>                                                                                                     |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>• general properties, chemical structures, rare amino acids in proteins,</li> <li>•</li> </ul>                                                                        |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>• amino acid interactions, peptides and their types, non-protein amino acids, their importance,</li> </ul>                                                            |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>• the structure of some of them, amino acid interactions, amino acid sequences.</li> </ul>                                                                            |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>• First Exam..</li> </ul>                                                                                                                                             |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>• Proteins, their functions, classification, and structure.</li> </ul>                                                                                                |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>• Estimating protein levels. Changing natural characteristics.</li> </ul>                                                                                             |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>• Lipids, their functions and classification,</li> <li>•</li> </ul>                                                                                                   |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>• Second Exam.</li> </ul>                                                                                                                                             |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>• fats and oils, phosphorylated fats, steroids, waxes, proteins, glycosylated fats, neutral chemical properties.</li> </ul>                                           |
| <b>Week 16</b> |                                                                                                                                                                                                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                      |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                              |
| <b>Week 1</b>                                                                  | Mulch revealed and Silvanov revealed carbohydrates.                                  |
| <b>Week 2</b>                                                                  | Bial's detection, Fehlnick's detection, citric acid detection, and parvoid detection |
| <b>Week 3</b>                                                                  | Ozaron reactions and iodine detection                                                |
| <b>Week 4</b>                                                                  | Revealing the unknown about carbohydrates                                            |
| <b>Week 5</b>                                                                  | Fat detection, unsaturation detection                                                |
| <b>Week 6</b>                                                                  | copper acetate detection.                                                            |

|        |            |
|--------|------------|
| Week 7 | First test |
|--------|------------|

## Learning and Teaching Resources

مصادر التعلم والتدريس

. الدلالي ، باسل (1992) البروتينات

2- . ( الدلالي ، باسل (1994) فهم الأنزيمات (مترجم

3- . الدلالي ، باسل (1998) الكيمياء الحيوية

4- . المظفر ، سامي (2001). الكيمياء الحياتية

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.





ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                           |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information       |                 |  |                                                              |  |  |
|--------------------------|-----------------|--|--------------------------------------------------------------|--|--|
| معلومات المادة الدراسية  |                 |  |                                                              |  |  |
| Module Title             | Bio Chemistry-2 |  | Module Delivery                                              |  |  |
| Module Type              | C               |  | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |  |
| Module Code              |                 |  |                                                              |  |  |
| ECTS Credits             | 3.00            |  |                                                              |  |  |
| SWL (hr/sem)             | 150             |  |                                                              |  |  |
| Module Level             |                 |  | Semester of Delivery                                         |  |  |
| Administering Department |                 |  | College                                                      |  |  |

|                                    |                    |                                      |       |
|------------------------------------|--------------------|--------------------------------------|-------|
| <b>Module Leader</b>               | <b>Talat Tariq</b> | <b>e-mail</b>                        |       |
| <b>Module Leader's Acad. Title</b> | Prof.              | <b>Module Leader's Qualification</b> | Ph.D. |
| <b>Module Tutor</b>                |                    | <b>e-mail</b>                        | None  |
| <b>Peer Reviewer Name</b>          |                    | <b>e-mail</b>                        |       |
| <b>Review Committee Approval</b>   |                    | <b>Version Number</b>                | 1.0   |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Presentation of organic chemical compounds such as carbohydrates, lipids, vitamins, nucleotides, and nucleic acids.<br>2- Presenting the chemical structures of organic compounds in the living cell.<br>3- Explaining the reactions of oxidation, reduction, transport, neutralization, and hydrolysis that take place in the living cell with the help of enzymes.<br>4- Preparing the student to know the biological importance of nucleotides, DNA, and RNA<br>5- Discussing the properties of water and its role in living cells.<br>6- Knowing the importance of biochemistry in applied fields. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 4. It is well known that Biochemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.<br><br>5. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.                                                                                                                                                                                                                                                                                                                                                                                  |                 |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | 6. Students can handle the chemicals with good experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 2. Biochemistry is one of the scientific subjects of great importance in learning about the chemical reactions that take place in the living cells of living organisms, through which you learn about the nature of these reactions, which include the corresponding oxidation, reduction, transport, and hydrolysis reactions, which involve five thousand enzymes that can transform the basic substances (the reactants ) into products over a period of time sometimes estimated at nanoseconds. We also learn through this course about carbohydrates, fats, and vitamins, which are one of the biochemical components of the foods that we eat daily in our food. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |                       |                 |                                  |
|---------------------------------------------------|--------------------|-----------------------|-----------------|----------------------------------|
|                                                   | <b>Time/Number</b> | <b>Weight (Marks)</b> | <b>Week Due</b> | <b>Relevant Learning Outcome</b> |

|                             |                        |      |                  |            |                     |
|-----------------------------|------------------------|------|------------------|------------|---------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2    | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11 |
|                             | <b>Assignments</b>     | 2    | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7  |
|                             | <b>Projects / Lab.</b> | 1    | 10% (10)         | Continuous |                     |
|                             | <b>Report</b>          | 1    | 10% (10)         | 13         | LO # 5, 8 and 10    |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr | 10% (10)         | 7          | LO # 1-7            |
|                             | <b>Final Exam</b>      | 2hr  | 50% (50)         | 16         | All                 |
| <b>Total assessment</b>     |                        |      | 100% (100 Marks) |            |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | Material Covered                                                                                                                                                                                                                      |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>Nucleotides, nucleosides, nucleic acids, functions of nucleotides, nitrogenous bases, their types, nucleic acids, DNA, double helix structure, hydrogen bonding, RNA and its types.</li> </ul> |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>, functions of nucleotides, nitrogenous bases,</li> </ul>                                                                                                                                      |
| <b>Week 3</b>  | types, nucleic acids, DNA, double helix structure,                                                                                                                                                                                    |
| <b>Week 4</b>  | hydrogen bonding, RNA and its types.                                                                                                                                                                                                  |
| <b>Week 5</b>  | Vitamins and their importance, fat-soluble vitamins, their types                                                                                                                                                                      |
| <b>Week 6</b>  | drawing the chemical structures of some of them, water-soluble vitamins, their types,                                                                                                                                                 |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                                                                         |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>enzymatic conjugates, the chemical structure of some of them, enzymatic conjugates other than vitamins.</li> </ul>                                                                             |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Enzymes, their general properties, life applications, classification,</li> </ul>                                                                                                               |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>Michelin-Finest equation, active sites, enzyme inhibitors, enzymes of similar origin, regulatory enzymes, enzyme compounds, factors affecting the speed of the enzymatic reaction.</li> </ul>  |
| <b>Week 11</b> | Energy, its types, transfer, standard free energy, ATP and its importance                                                                                                                                                             |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>ADP and energy transfer, the role of phosphate compounds.</li> </ul>                                                                                                                           |
| <b>Week 13</b> | Hormones, their classification, chemical formula                                                                                                                                                                                      |
| <b>Week 14</b> | secretory glands, insulin and glucocorticoid hormones and their importance                                                                                                                                                            |
| <b>Week 15</b> | Second Exam                                                                                                                                                                                                                           |
| <b>Week 16</b> |                                                                                                                                                                                                                                       |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                                                    |
|------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                  | Material Covered                                                   |
| Week 1                                                           | Rosenheim reaction Millon reaction                                 |
| Week 2                                                           | Zakakuji reaction, reactions of sulphide amino acids               |
| Week 3                                                           | - Lead sulfide detection, biuret detection                         |
| Week 4                                                           | Precipitation of amino acids with neutral salts                    |
| Week 5                                                           | Uncover the unknown                                                |
| Week 6                                                           | - Detection of the quality of amino acids by paper electrophoresis |
| Week 7                                                           | First test                                                         |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس<br>الدلالي ، باسل (1992) البروتينات<br>( الدلالي ، باسل (1994) فهم الأنزيمات (مترجم<br>الدلالي ، باسل (1998) الكيمياء الحيوية<br>4- المظفر ، سامي (2001) الكيمياء الحياتية |      |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
|                                                                                                                                                                                                                                     | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                      |      | yes                       |
| Recommended Texts                                                                                                                                                                                                                   |      | No                        |
| Websites                                                                                                                                                                                                                            |      |                           |

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |               |         |           |                         |
|--------------------------------|---------------|---------|-----------|-------------------------|
| Group                          | Grade         | التقدير | Marks (%) | Definition              |
| Success Group                  | A - Excellent | امتياز  | 90 - 100  | Outstanding Performance |

|                        |                  |             |         |                                       |
|------------------------|------------------|-------------|---------|---------------------------------------|
| (50 - 100)             | B - Very Good    | جيد جدا     | 80 - 89 | Above average with some errors        |
|                        | C - Good         | جيد         | 70 - 79 | Sound work with notable errors        |
|                        | D - Satisfactory | متوسط       | 60 - 69 | Fair but with major shortcomings      |
|                        | E - Sufficient   | مقبول       | 50 - 59 | Work meets minimum criteria           |
| Fail Group<br>(0 - 49) | FX – Fail        | مقبول بقرار | (45-49) | More work required but credit awarded |
|                        | F – Fail         | راسب        | (0-44)  | Considerable amount of work required  |
|                        |                  |             |         |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                               |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

# MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                        |         |                                                              |      |
|-----------------------------|------------------------|---------|--------------------------------------------------------------|------|
| معلومات المادة الدراسية     |                        |         |                                                              |      |
| Module Title                | Industrial Chemistry-1 |         | Module Delivery                                              |      |
| Module Type                 | C                      |         | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |      |
| Module Code                 |                        |         |                                                              |      |
| ECTS Credits                | 2.00                   |         |                                                              |      |
| SWL (hr/sem)                | 150                    |         |                                                              |      |
| Module Level                |                        |         | Semester of Delivery                                         |      |
| Administering Department    |                        |         | College                                                      |      |
| Module Leader               | Mohammed Eidan         |         | e-mail                                                       |      |
| Module Leader's Acad. Title |                        | Lecture | Module Leader's Qualification                                |      |
| Module Tutor                |                        |         | e-mail                                                       | None |
| Peer Reviewer Name          |                        |         | e-mail                                                       |      |
| Review Committee Approval   |                        |         | Version Number                                               | 1.0  |

| Relation with Other Modules                              |                                                                                                  |          |  |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                  |          |  |
| Prerequisite module                                      | None                                                                                             | Semester |  |
| Co-requisites module                                     | None                                                                                             | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                  |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                  |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | The course aims to:<br>1- Make students able to know the different types of industrial reactors. |          |  |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   | <p>2- Make students able to know the industrial foundations for preparing some industrial products.</p> <p>3- Providing students with skills in diagnosing and knowing industrial foundations.</p> <p>4- Providing students with the necessary experiences to be able to enter the field of the chemical industry.</p> <p>5- Students' knowledge of industrial units and their applications for producing industrial products.</p> <p>6- Learn about the various types of cement industry.</p> <p>7- Increasing industrial laboratories and learning about the progress of industrial operations.</p> <p>8- Identify the food industries and their importance in the national economy.</p> <p>9- Be aware of the danger resulting from chemical environmental pollution.</p> <p>10- Learn how to treat water for industrial purposes.</p> |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>       | <p>7. It is well known that industrial chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</p> <p>8. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</p> <p>9. Students can handle the chemicals with good experience.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                      | <p>3. The course aims for the department's students to acquire information and skills that will make them able to understand industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>Learning and Teaching Strategies</b></p> <p>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Strategies</b>                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



| Student Workload (SWL)<br>الحمل الدراسي للطالب                          |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                    |    |

| Module Evaluation<br>تقييم المادة الدراسية |                 |             |                  |            |                           |
|--------------------------------------------|-----------------|-------------|------------------|------------|---------------------------|
|                                            |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                            | Assignments     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                            | Projects / Lab. | 1           | 10% (10)         | Continuous |                           |
|                                            | Report          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| Summative assessment                       | Midterm Exam    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                            | Final Exam      | 2hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                 |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                                  |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                 |
| Week 1                                                     | <ul style="list-style-type: none"> <li>Introduction, general introduction, directions and guidelines.</li> </ul> |
| Week 2                                                     | <ul style="list-style-type: none"> <li>Introduction, general introduction, directions and guidelines.</li> </ul> |
| Week 3                                                     | <ul style="list-style-type: none"> <li>Introduction to industrial chemistry..</li> </ul>                         |
| Week 4                                                     | <ul style="list-style-type: none"> <li>Chemical manufacturing process technology.</li> </ul>                     |
| Week 5                                                     | <ul style="list-style-type: none"> <li>Types of industrial reactors</li> </ul>                                   |
| Week 6                                                     | <ul style="list-style-type: none"> <li>Heterogeneous reactors.</li> </ul>                                        |
| Week 7                                                     | <ul style="list-style-type: none"> <li>Chemical process flow thickeners.</li> </ul>                              |
| Week 8                                                     | <ul style="list-style-type: none"> <li>Water treatment for industrial purposes,</li> </ul>                       |
| Week 9                                                     | <ul style="list-style-type: none"> <li>Industrial pollution.</li> </ul>                                          |

|         |                      |
|---------|----------------------|
| Week 10 | • First Exam.        |
| Week 11 | • Corrosion.         |
| Week 12 | • Cement industry .. |
| Week 13 | • Second month exam. |
| Week 14 | • Paper Industry, .  |
| Week 15 | Sugar industry       |
| Week 16 |                      |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                            |
|--------------------------------------------------------------------------------|----------------------------|
|                                                                                | Material Covered           |
| Week 1                                                                         | لا يوجد عملي في هذه المادة |
| Week 2                                                                         |                            |
| Week 3                                                                         |                            |
| Week 4                                                                         |                            |
| Week 5                                                                         |                            |
| Week 6                                                                         |                            |
| Week 7                                                                         |                            |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس 1- الكيمياء الصناعية د. كوركيس عبد ال دم 1992 .</b><br><b>2-Cary coyne(1997) . chemistry and the chemical</b><br><b>3-Frank,M.dunnivat.(2004).Enviromental laboratory excexcises for industriment analysis and environmental chemistry.</b><br><b>4-Harold .F.W.Taylor.(1990).cement chemistry.</b> |      |                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
|                                                                                                                                                                                                                                                                                                                                                                        | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                                                                                                                                                         |      | yes                       |

|                   |  |    |
|-------------------|--|----|
| Recommended Texts |  | No |
| Websites          |  |    |

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Chemistry



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                        |                               |                                                              |
|-----------------------------|------------------------|-------------------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية     |                        |                               |                                                              |
| Module Title                | Industrial Chemistry-2 |                               | Module Delivery                                              |
| Module Type                 | C                      |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code                 |                        |                               |                                                              |
| ECTS Credits                | 2.00                   |                               |                                                              |
| SWL (hr/sem)                | 150                    |                               |                                                              |
| Module Level                |                        | Semester of Delivery          |                                                              |
| Administering Department    |                        | College                       |                                                              |
| Module Leader               | Mohammed Eidan         | e-mail                        |                                                              |
| Module Leader's Acad. Title | Lecture                | Module Leader's Qualification |                                                              |
| Module Tutor                |                        | e-mail                        | None                                                         |
| Peer Reviewer Name          |                        | e-mail                        |                                                              |
| Review Committee Approval   |                        | Version Number                | 1.0                                                          |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Make students able to know the different types of industrial reactors.<br>2- Make students able to know the industrial foundations for preparing some industrial products.<br>3- Providing students with skills in diagnosing and knowing industrial foundations.<br>4- Providing students with the necessary experiences to be able to enter the field of the chemical industry.<br>5- Students' knowledge of industrial units and their applications for producing industrial products.<br>6- Learn about the various types of cement industry.<br>7- Increasing industrial laboratories and learning about the progress of industrial operations.<br>8- Identify the food industries and their importance in the national economy.<br>9- Be aware of the danger resulting from chemical environmental pollution.<br>10- Learn how to treat water for industrial purposes. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 10. It is well known that industrial chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.<br>11. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.<br>12. Students can handle the chemicals with good experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |  |
| <b>Indicative Contents</b>                                                                                                | 4. The course aims for the department's students to acquire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |  |

|                                                                               |                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| المحتويات الإرشادية                                                           | information and skills that will make them able to understand industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories. |
| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                    |
| Strategies                                                                    |                                                                                                                                                                                                                                                    |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>                   |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                                                  |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                                                          |
| <b>Week 1</b>                                                            | <ul style="list-style-type: none"> <li>Introduction, general introduction, directions and guidelines.</li> </ul> |

|                |                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------|
|                |                                                                                                                    |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>• Introduction, general introduction, directions and guidelines.</li> </ul> |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>• Introduction to industrial chemistry..</li> </ul>                         |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>• Chemical manufacturing process technology.</li> </ul>                     |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>• Types of industrial reactors</li> </ul>                                   |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>• Fertilizer industry.</li> </ul>                                           |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>• Chemical process flow thickeners.</li> </ul>                              |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>• Dyes industry.</li> </ul>                                                 |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>• Industrial pollution.</li> </ul>                                          |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>• First Exam.</li> </ul>                                                    |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>• Sulphide industries.</li> </ul>                                           |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>• Cement industry</li> </ul>                                                |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>• Second month exam.</li> </ul>                                             |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>• Pesticide industry</li> </ul>                                             |
| <b>Week 15</b> | Second Exam                                                                                                        |
| <b>Week 16</b> |                                                                                                                    |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                           |
|--------------------------------------------------------------------------------|---------------------------|
|                                                                                | <b>Material Covered</b>   |
| <b>Week 1</b>                                                                  | لايوجد عملي في هذه المادة |
| <b>Week 2</b>                                                                  |                           |
| <b>Week 3</b>                                                                  |                           |
| <b>Week 4</b>                                                                  |                           |
| <b>Week 5</b>                                                                  |                           |
| <b>Week 6</b>                                                                  |                           |
| <b>Week 7</b>                                                                  |                           |

## Learning and Teaching Resources

### مصادر التعلم والتدريس

مصادر التعلم والتدريس 1- الكيمياء الصناعية د. كوركيس عبد ال ادم 1992 .

2-Cary coyne(1997) . chemistry and the chemical

3-Frank,M.dunnivat.(2004).Enviromental laboratory excercises for industriment analysis and environmental chemistry.

4-Harold .F.W.Taylor.(1990).cement chemistry.

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.





ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                    |                                                                                      |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information       |                     |  |                                                              |  |  |
|--------------------------|---------------------|--|--------------------------------------------------------------|--|--|
| معلومات المادة الدراسية  |                     |  |                                                              |  |  |
| Module Title             | Organic Chemistry-1 |  | Module Delivery                                              |  |  |
| Module Type              | C                   |  | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |  |
| Module Code              |                     |  |                                                              |  |  |
| ECTS Credits             | 3.00                |  |                                                              |  |  |
| SWL (hr/sem)             | 150                 |  |                                                              |  |  |
| Module Level             |                     |  | Semester of Delivery                                         |  |  |
| Administering Department |                     |  | College                                                      |  |  |

|                                    |                     |                                      |       |
|------------------------------------|---------------------|--------------------------------------|-------|
| <b>Module Leader</b>               | <b>Ahmed Hassan</b> | <b>e-mail</b>                        |       |
| <b>Module Leader's Acad. Title</b> | Assist.Prof.        | <b>Module Leader's Qualification</b> | Ph.D. |
| <b>Module Tutor</b>                |                     | <b>e-mail</b>                        | None  |
| <b>Peer Reviewer Name</b>          |                     | <b>e-mail</b>                        |       |
| <b>Review Committee Approval</b>   |                     | <b>Version Number</b>                | 1.0   |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Naming, preparation and reactions of aldehydes and ketones and the mechanics of their reactions.<br>2- Naming, preparation and reactions of carboxylic acids and the mechanics of their reactions.<br>3- Naming, preparation and reactions of carboxylic acid derivatives and the mechanics of their reactions.<br>4- Stereochemistry terms, preparation and reactions of stereoisomers.<br>5- Naming, preparation and reactions of amines and the mechanics of their reactions.<br>6- Naming, preparation and reactions of phenols and the mechanics of their reactions.<br>7- Naming, preparation and reactions of aryl halides and the mechanics of their reactions.<br>8- Carban negative ion reactions (1).<br>9- Carban negative ion reactions (2). |                 |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية       | 13. It is well known that Organic chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.<br><br>14. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.<br><br>15. Students can handle the chemicals with good experience.                                                                                                                     |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | Organic chemistry for the third stage is considered complementary to the second stage, as it deals with aldehydes, ketones, carboxylic acids and their derivatives, amines, phenols, and aryl halides, and their naming methods, preparations, and interactions, as well as stereochemistry and reaction mechanics, as well as polycyclic compounds and heterogeneous compounds, and methods for naming them, preparations, and interactions. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |         |                |          |                   |
|---------------------------------------------------|---------|----------------|----------|-------------------|
|                                                   | Time/Nu | Weight (Marks) | Week Due | Relevant Learning |

|                      |                 | number |                  |            | Outcome             |
|----------------------|-----------------|--------|------------------|------------|---------------------|
| Formative assessment | Quizzes         | 2      | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11 |
|                      | Assignments     | 2      | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7  |
|                      | Projects / Lab. | 1      | 10% (10)         | Continuous |                     |
|                      | Report          | 1      | 10% (10)         | 13         | LO # 5, 8 and 10    |
| Summative assessment | Midterm Exam    | 2 hr   | 10% (10)         | 7          | LO # 1-7            |
|                      | Final Exam      | 2hr    | 50% (50)         | 16         | All                 |
| Total assessment     |                 |        | 100% (100 Marks) |            |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|         | Material Covered                                                                                                                                                                                                                                                 |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | <ul style="list-style-type: none"> <li>Naming aldehydes and ketones and their first physical properties</li> </ul>                                                                                                                                               |
| Week 2  | <ul style="list-style-type: none"> <li>- Preparation of aldehydes and ketones II</li> </ul>                                                                                                                                                                      |
| Week 3  | <ul style="list-style-type: none"> <li>- Reactions of aldehydes and ketones</li> </ul>                                                                                                                                                                           |
| Week 4  | <ul style="list-style-type: none"> <li>- Naming the fourth carboxylic acids</li> </ul>                                                                                                                                                                           |
| Week 5  | <ul style="list-style-type: none"> <li>- Preparation of fifth carboxylic acids</li> </ul>                                                                                                                                                                        |
| Week 6  | <ul style="list-style-type: none"> <li>- Reactions of sixth carboxylic acids</li> </ul>                                                                                                                                                                          |
| Week 7  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                                                                                                    |
| Week 8  | <ul style="list-style-type: none"> <li>- Naming derivatives of carboxylic acids VII</li> </ul>                                                                                                                                                                   |
| Week 9  | <ul style="list-style-type: none"> <li>- Preparation of derivatives of carboxylic acids VIII</li> </ul>                                                                                                                                                          |
| Week 10 | <ul style="list-style-type: none"> <li>- Reactions of carboxylic acid derivatives IX</li> </ul>                                                                                                                                                                  |
| Week 11 | <ul style="list-style-type: none"> <li>- Stereochemistry.</li> </ul>                                                                                                                                                                                             |
| Week 12 | <ul style="list-style-type: none"> <li>- Amines, their names, properties, and preparations</li> </ul>                                                                                                                                                            |
| Week 13 | <ul style="list-style-type: none"> <li>- Reactions of the thirteenth amines</li> </ul>                                                                                                                                                                           |
| Week 14 | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>                                                                                                                                                                                                   |
| Week 15 | <ul style="list-style-type: none"> <li>- Phenols, their names, properties, and preparations XIV</li> <li>- Reactions of phenols XV</li> <li>- Aryl halides, their names, properties, and preparations sixteenth</li> <li>- Reactions of aryl halides.</li> </ul> |
| Week 16 |                                                                                                                                                                                                                                                                  |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered                                       |
|--------|--------------------------------------------------------|
| Week 1 | - The first risks of chemicals                         |
| Week 2 | - Preparation of diphenylmethane II                    |
| Week 3 | - Preparation of benzophenone from diphenylmethane III |
| Week 4 | Preparation of benzophenone from benzoyl IV chloride   |
| Week 5 | - Preparation of benzophenone oxime V                  |
| Week 6 | - Sixth Beckman reaction                               |
| Week 7 | First test                                             |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

Organic chemistry by R. Morrisn and R. boyd ,4th Edition Allyn and Bacon1998

2-الكيمياء العضوية فهدعلي حسين وجماعته الجزء الاول جامعة بغداد 1977

Organic reaction mechanisms by Groutas, William 1st edition 2000

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |                  |             |           |                                       |
|--------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                          | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)    | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)         | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                |                  |             |           |                                       |

**Note:**

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                    |                                                                                       |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

#### Module Information

معلومات المادة الدراسية

| Module Title                | Organic Chemistry-2 |              |                               | Module Delivery                                              |       |
|-----------------------------|---------------------|--------------|-------------------------------|--------------------------------------------------------------|-------|
| Module Type                 | C                   |              |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |       |
| Module Code                 |                     |              |                               |                                                              |       |
| ECTS Credits                |                     |              |                               |                                                              |       |
| SWL (hr/sem)                |                     |              |                               |                                                              |       |
| Module Level                |                     |              | Semester of Delivery          |                                                              |       |
| Administering Department    |                     |              | College                       |                                                              |       |
| Module Leader               | Ahmed Hassan        |              | e-mail                        |                                                              |       |
| Module Leader's Acad. Title |                     | Assist.Prof. | Module Leader's Qualification |                                                              | Ph.D. |
| Module Tutor                |                     |              | e-mail                        | None                                                         |       |
| Peer Reviewer Name          |                     |              | e-mail                        |                                                              |       |
| Review Committee Approval   |                     |              | Version Number                |                                                              | 1.0   |

| Relation with Other Modules                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
| Prerequisite module                                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Semester |  |
| Co-requisites module                                     | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | <p>The course aims to:</p> <ol style="list-style-type: none"> <li>1- Naming, preparation and reactions of aldehydes and ketones and the mechanics of their reactions.</li> <li>2- Naming, preparation and reactions of carboxylic acids and the mechanics of their reactions.</li> <li>3- Naming, preparation and reactions of carboxylic acid derivatives and the mechanics of their reactions.</li> <li>4- Stereochemistry terms, preparation and reactions of stereoisomers.</li> <li>5- Naming, preparation and reactions of amines and the mechanics</li> </ol> |          |  |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   | <p>of their reactions.</p> <p>6- Naming, preparation and reactions of phenols and the mechanics of their reactions.</p> <p>7- Naming, preparation and reactions of aryl halides and the mechanics of their reactions.</p> <p>8- Carban negative ion reactions (1).</p> <p>9- Carban negative ion reactions (2).</p>                                                                                                                                  |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>       | <p>16. It is well known that Organic chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</p> <p>17. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</p> <p>18. Students can handle the chemicals with good experience.</p>                                                                                                                     |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                      | <p>Organic chemistry for the third stage is considered complementary to the second stage, as it deals with aldehydes, ketones, carboxylic acids and their derivatives, amines, phenols, and aryl halides, and their naming methods, preparations, and interactions, as well as stereochemistry and reaction mechanics, as well as polycyclic compounds and heterogeneous compounds, and methods for naming them, preparations, and interactions.</p> |
| <p><b>Learning and Teaching Strategies</b></p> <p>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Strategies</b></p>                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|                                                                  |
|------------------------------------------------------------------|
| <p><b>Student Workload (SWL)</b></p> <p>الحمل الدراسي للطالب</p> |
|------------------------------------------------------------------|



|                                                                                |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |    |

## Module Evaluation

### تقييم المادة الدراسية

|                             |                               | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|-------------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>                | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                             | <b>Assignments</b>            | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                             | <b>Projects / Lab. Report</b> | 1           | 10% (10)         | Continuous |                           |
|                             | <b>Report</b>                 | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b> | <b>Midterm Exam</b>           | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                             | <b>Final Exam</b>             | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                               |             | 100% (100 Marks) |            |                           |

## Delivery Plan (Weekly Syllabus)

### المناهج الأسبوعي النظري

|               | Material Covered                                                                                                                                                                     |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b> | <ul style="list-style-type: none"> <li>- Aryl halides, their names, properties, and preparations sixteenth</li> <li>.</li> </ul>                                                     |
| <b>Week 2</b> | <ul style="list-style-type: none"> <li>- Reactions of the seventeenth aryl halides</li> <li>- Examination of the eighteenth second month</li> <li>.</li> <li>.</li> <li>.</li> </ul> |
| <b>Week 3</b> | <ul style="list-style-type: none"> <li>- Carbanion 1, nineteenth edition</li> <li>.</li> </ul>                                                                                       |
| <b>Week 4</b> | <ul style="list-style-type: none"> <li>- Carbanion 1 Reactions Twenty</li> <li>.</li> </ul>                                                                                          |
| <b>Week 5</b> | <ul style="list-style-type: none"> <li>- Carbanion 2, twenty-first edition</li> </ul>                                                                                                |
| <b>Week 6</b> | <ul style="list-style-type: none"> <li>Carbanion Reactions 2 xxii</li> </ul>                                                                                                         |
| <b>Week 7</b> | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                        |
| <b>Week 8</b> | <ul style="list-style-type: none"> <li>- Alpha Beta for unsaturated carbon compounds twenty-third</li> <li>.</li> </ul>                                                              |

|                |                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>- Reactions of unsaturated carbon compounds twenty-fourth</li> <li></li> </ul>                                    |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>- Polycyclic aromatic compounds twenty-fifth</li> <li></li> </ul>                                                 |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>- Interactions of polycyclic aromatic compounds twenty-sixth</li> <li></li> <li></li> </ul>                       |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>- Heterocyclic compounds, nomenclature, and preparation twenty-seventh</li> <li></li> </ul>                       |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>- Its interactions.</li> </ul>                                                                                    |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Chemistry of internal transition elements (lactanes), general properties, applications, classification</li> </ul> |
| <b>Week 15</b> | Second Exam                                                                                                                                              |
| <b>Week 16</b> | General Review                                                                                                                                           |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                    |
|--------------------------------------------------------------------------------|------------------------------------|
|                                                                                | <b>Material Covered</b>            |
| <b>Week 1</b>                                                                  | Fisher reaction                    |
| <b>Week 2</b>                                                                  | Preparation of benzoic acid        |
| <b>Week 3</b>                                                                  | Preparation of nitrobenzene        |
| <b>Week 4</b>                                                                  | Preparation of aniline             |
| <b>Week 5</b>                                                                  | Preparation of phenol from aniline |
| <b>Week 6</b>                                                                  | Preparation of diazo benzene       |
| <b>Week 7</b>                                                                  | First test                         |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b><br><b>Organic chemistry by R. Morrison and R. Boyd, 4th Edition Allyn and Bacon 1998</b><br><b>2-الكيمياء العضوية فهد علي حسين وجماعته الجزء الاول جامعة بغداد 1977</b><br><b>Organic reaction mechanisms by Groutas, William 1st edition 2000</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                   |                                                                                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                      |       |                               |                                                              |       |
|-----------------------------|----------------------|-------|-------------------------------|--------------------------------------------------------------|-------|
| معلومات المادة الدراسية     |                      |       |                               |                                                              |       |
| Module Title                | Physical Chemistry-1 |       |                               | Module Delivery                                              |       |
| Module Type                 | C                    |       |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |       |
| Module Code                 |                      |       |                               |                                                              |       |
| ECTS Credits                | 3.00                 |       |                               |                                                              |       |
| SWL (hr/sem)                | 150                  |       |                               |                                                              |       |
| Module Level                |                      |       | Semester of Delivery          |                                                              |       |
| Administering Department    |                      |       | College                       |                                                              |       |
| Module Leader               | Ayad Mohammed        |       | e-mail                        |                                                              |       |
| Module Leader's Acad. Title |                      | Prof. | Module Leader's Qualification |                                                              | Ph.D. |
| Module Tutor                |                      |       | e-mail                        | None                                                         |       |
| Peer Reviewer Name          |                      |       | e-mail                        |                                                              |       |
| Review Committee Approval   |                      |       | Version Number                | 1.0                                                          |       |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | <p>The course aims to:</p> <ol style="list-style-type: none"> <li>1- Give a general idea about Faraday's laws</li> <li>2- Connecting electrolytic conductors and metal conductors</li> <li>3- Identify the types of connectivity</li> <li>4- How to calculate the degree of ionization for weak electrolytes</li> <li>5- The effect of concentration and temperature on conductivity</li> <li>6- Identify methods for calculating transition numbers</li> <li>7- Calculating the dissolution yield constant</li> <li>8- Linking solution chemistry and thermodynamics</li> <li>9- Study of simple and complex reaction kinetics</li> <li>10- Study the effect of temperature on the speed of reactions</li> <li>11- Increasing the student's ability to understand the technique of receiving devices related to physical chemistry.</li> <li>12- Introducing the student to how to link theoretical concepts and practical applications.</li> <li>13- Teaching the student how to solve assignments</li> <li>14- Improving the student's ability to write scientific reports</li> </ol> |                 |  |
| <b>Module Learning Outcomes</b>                                                                                           | 19. It is well known that Physical chemistry is the main subject in chemistry which mean it can be taken in all types of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |  |

|                                                                               |                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| مخرجات التعلم للمادة الدراسية                                                 | <p>chemistry.</p> <p>20.Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</p> <p>21. Students can handle the chemicals with good experience.</p> |
| Indicative Contents<br>المحتويات الإرشادية                                    | 5. It is well known that Physical chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.                                                                      |
| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                         |
| Strategies                                                                    |                                                                                                                                                                                                         |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>            |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                    |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                 |             |                |            |                           |
|----------------------------------------------------------|-----------------|-------------|----------------|------------|---------------------------|
|                                                          |                 | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
| Formative assessment                                     | Quizzes         | 2           | 10% (10)       | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | Assignments     | 2           | 10% (10)       | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | Projects / Lab. | 1           | 10% (10)       | Continuous |                           |
|                                                          | Report          | 1           | 10% (10)       | 13         | LO # 5, 8 and 10          |
| Summative assessment                                     | Midterm Exam    | 2 hr        | 10% (10)       | 7          | LO # 1-7                  |
|                                                          | Final Exam      | 2hr         | 50% (50)       | 16         | All                       |

|                         |                  |  |  |
|-------------------------|------------------|--|--|
| <b>Total assessment</b> | 100% (100 Marks) |  |  |
|-------------------------|------------------|--|--|

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | <b>Material Covered</b>                                                                                                                                                                                                                                  |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>Chemistry and electricity.</li> <li>Potential differences at interfaces.</li> </ul>                                                                                                                               |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>Electrochemical cells.</li> <li>Transport of charge within the cell.</li> </ul>                                                                                                                                   |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>Electrodes and electrode reactions.</li> <li>Cell description conventions</li> </ul>                                                                                                                              |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>Standard half-cell potentials.</li> <li>Reference electrodes.</li> <li>Prediction of cell potentials.</li> <li>Cell potentials and the electromotive series.</li> <li>Cell potentials and free energy.</li> </ul> |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>The Nernst equation.</li> <li>Concentration cells.</li> </ul>                                                                                                                                                     |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>Analytical applications of the Nernst equation.</li> <li>Determination of solubility products.</li> </ul>                                                                                                         |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                                                                                            |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>Potentiometric titrations.</li> <li>Measurement of pH.</li> </ul>                                                                                                                                                 |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Membrane potentials.</li> </ul>                                                                                                                                                                                   |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>Batteries and fuel cells.</li> </ul>                                                                                                                                                                              |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>The fuel cell ..</li> </ul>                                                                                                                                                                                       |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>Electrochemical Corrosion.</li> <li>Control of corrosion.</li> </ul>                                                                                                                                              |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>Electrolytic cells.</li> <li>Electrolysis involving water.</li> <li>Faraday's laws of electrolysis</li> </ul>                                                                                                     |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>                                                                                                                                                                                           |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>Industrial electrolytic processes.</li> </ul>                                                                                                                                                                     |
| <b>Week 16</b> |                                                                                                                                                                                                                                                          |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered                                                                                                                         |
|--------|------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 | Define the cell constant                                                                                                                 |
| Week 2 | - Determine the equivalent conductivity of the weak acid at different concentrations and calculate the dissociation constant of the acid |
| Week 3 | Determine the equivalent conductivity of a strong electrolyte solution and test the validity of Unsaker's theory                         |
| Week 4 | - Determine the difference in the equivalent ionic conductivity of two ions from two completely dissociated salts                        |
| Week 5 | - Determine the solubility of lead sulphate or silver chromate in water at 25°C                                                          |
| Week 6 | Determine the degree of decomposition of aniline chloride in aqueous solution at 25°C.                                                   |
| Week 7 | First test                                                                                                                               |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

Physical Chemistry, Atkins, 6th ed. 2001

.Problems in physical chemistry 1st , by K.K. Shrma,1994

.Physical chemistry 5th by Walter J. Moor, 1972

.Physical chemistry 7th by Robert Al-Berty, 1987

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

#### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade         | التقدير | Marks (%) | Definition                     |
|-----------------------------|---------------|---------|-----------|--------------------------------|
| Success Group<br>(50 - 100) | A - Excellent | امتياز  | 90 - 100  | Outstanding Performance        |
|                             | B - Very Good | جيد جدا | 80 - 89   | Above average with some errors |
|                             | C - Good      | جيد     | 70 - 79   | Sound work with notable errors |



|                        |                  |             |         |                                       |
|------------------------|------------------|-------------|---------|---------------------------------------|
|                        | D - Satisfactory | متوسط       | 60 - 69 | Fair but with major shortcomings      |
|                        | E - Sufficient   | مقبول       | 50 - 59 | Work meets minimum criteria           |
| Fail Group<br>(0 – 49) | FX – Fail        | مقبول بقرار | (45-49) | More work required but credit awarded |
|                        | F – Fail         | راسب        | (0-44)  | Considerable amount of work required  |
|                        |                  |             |         |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                    |                                                                                       |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                      |                               |                                                              |       |
|-----------------------------|----------------------|-------------------------------|--------------------------------------------------------------|-------|
| معلومات المادة الدراسية     |                      |                               |                                                              |       |
| Module Title                | Physical Chemistry-2 |                               | Module Delivery                                              |       |
| Module Type                 | C                    |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |       |
| Module Code                 |                      |                               |                                                              |       |
| ECTS Credits                | 3.00                 |                               |                                                              |       |
| SWL (hr/sem)                | 150                  |                               |                                                              |       |
| Module Level                |                      | Semester of Delivery          |                                                              |       |
| Administering Department    |                      | College                       |                                                              |       |
| Module Leader               | Ayad Mohammed        |                               | e-mail                                                       |       |
| Module Leader's Acad. Title | Prof.                | Module Leader's Qualification |                                                              | Ph.D. |
| Module Tutor                |                      | e-mail                        | None                                                         |       |
| Peer Reviewer Name          |                      | e-mail                        |                                                              |       |
| Review Committee Approval   |                      | Version Number                | 1.0                                                          |       |

| Relation with Other Modules                              |                                                                                                                                                 |          |  |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                                                                 |          |  |
| Prerequisite module                                      | None                                                                                                                                            | Semester |  |
| Co-requisites module                                     | None                                                                                                                                            | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                 |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                 |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | <p>The course aims to:</p> <p>1- Give a general idea about Faraday's laws</p> <p>2- Connecting electrolytic conductors and metal conductors</p> |          |  |

|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | <p>3- Identify the types of connectivity</p> <p>4- How to calculate the degree of ionization for weak electrolytes</p> <p>5- The effect of concentration and temperature on conductivity</p> <p>6- Identify methods for calculating transition numbers</p> <p>7- Calculating the dissolution yield constant</p> <p>8- Linking solution chemistry and thermodynamics</p> <p>9- Study of simple and complex reaction kinetics</p> <p>10- Study the effect of temperature on the speed of reactions</p> <p>11- Increasing the student's ability to understand the technique of receiving devices related to physical chemistry.</p> <p>12- Introducing the student to how to link theoretical concepts and practical applications.</p> <p>13- Teaching the student how to solve assignments</p> <p>14- Improving the student's ability to write scientific reports</p> |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p> | <p>22. It is well known that Physical chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</p> <p>23. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</p> <p>24. Students can handle the chemicals with good experience.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                | <p>6. It is well known that Physical chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

|            |  |
|------------|--|
| Strategies |  |
|------------|--|

## Student Workload (SWL)

### الحمل الدراسي للطالب

|                                                                                |     |                                                                            |    |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                            |    |

## Module Evaluation

### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                             | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                             | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                             | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                        |             | 100% (100 Marks) |            |                           |

## Delivery Plan (Weekly Syllabus)

### المنهاج الأسبوعي النظري

|               | Material Covered                                                                         |
|---------------|------------------------------------------------------------------------------------------|
| <b>Week 1</b> | <ul style="list-style-type: none"> <li>Chemical kinetics ,general information</li> </ul> |
| <b>Week 2</b> | <ul style="list-style-type: none"> <li>First order of reaction</li> </ul>                |
| <b>Week 3</b> | <ul style="list-style-type: none"> <li>Second order of reaction</li> </ul>               |
| <b>Week 4</b> | <ul style="list-style-type: none"> <li>The speed of the reaction</li> </ul>              |
| <b>Week 5</b> | <ul style="list-style-type: none"> <li>Order of reaction and half-life-</li> </ul>       |

|                |                                                                                            |
|----------------|--------------------------------------------------------------------------------------------|
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>Determine the order of the reactions</li> </ul>     |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>Calculation</li> </ul>                              |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                              |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Complex Interactions</li> </ul>                     |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>Molecular reaction</li> </ul>                       |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>- Relaxation method</li> </ul>                      |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>- Arrhenius Equation</li> </ul>                     |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>Theories of reaction speed.</li> </ul>              |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>- Thermodynamics of the transition state</li> </ul> |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>                             |
| <b>Week 16</b> |                                                                                            |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                           |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                   |
| <b>Week 1</b>                                                                  | General experience in determining the rank of the first reaction          |
| <b>Week 2</b>                                                                  | Determine the order of the reaction and the rate constant for the         |
| <b>Week 3</b>                                                                  | decomposition of the ester in the presence of acid as the second catalyst |
| <b>Week 4</b>                                                                  | Determine the rate constant for the dissociation of diazonium III salt    |
| <b>Week 5</b>                                                                  | Study the effect of acid as a catalyst in the decomposition of ester IV   |
| <b>Week 6</b>                                                                  | Determine the activation energy for the decomposition of the fifth ester  |
| <b>Week 7</b>                                                                  | First test                                                                |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |   |
|------------------------------------------------------------------------|---|
| Physical Chemistry, Atkins, 6th ed. 2001                               |   |
| .Problems in physical chemistry 1st , by K.K. Shurma,1994              | • |
| .Physical chemistry 5th by Walter J. Moor, 1972                        | • |
| .Physical chemistry 7th by Robert Al-Berty, 1987                       | • |

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                   |                                                                                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                       |                               |                                                              |
|-----------------------------|-----------------------|-------------------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية     |                       |                               |                                                              |
| Module Title                | Inorganic Chemistry-1 |                               | Module Delivery                                              |
| Module Type                 | C                     |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code                 |                       |                               |                                                              |
| ECTS Credits                | 3.00                  |                               |                                                              |
| SWL (hr/sem)                | 150                   |                               |                                                              |
| Module Level                |                       | Semester of Delivery          |                                                              |
| Administering Department    |                       | College                       |                                                              |
| Module Leader               | Suad Taha Saad        | e-mail                        |                                                              |
| Module Leader's Acad. Title | Assist.Prof.          | Module Leader's Qualification | Ph.D.                                                        |
| Module Tutor                |                       | e-mail                        | None                                                         |
| Peer Reviewer Name          |                       | e-mail                        |                                                              |
| Review Committee Approval   |                       | Version Number                | 1.0                                                          |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>The course aims to introduce the student to theoretical inorganic chemistry by identifying the elements of the periodic table under study.<br>7- Distinguish between transitional elements through their periodic properties.<br>8- Interpreting complexes through different theories of association.<br>9- Interpreting the complex spectra of these elements and benefiting from that practically. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 25. It is well known that Coordination chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.<br>26. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.<br>27. Students can handle the chemicals with good experience.                                                                                                      |                 |  |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | 7. Coordination chemistry specializes in the study of coordination compounds or metal complexes. The complex compound consists of the union of an atom or a central ion with one or more ligands (negative or positive ions or neutral molecules). The properties of the resulting complex differ completely from the properties of any of its components. Coordination chemistry is also concerned with studying           |                 |  |



|                                                                               |                                                                                                                                    |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | theories of interpretation. Coordination compounds, methods of preparing them, stabilization, and mechanics of their interactions. |
| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                    |
| Strategies                                                                    |                                                                                                                                    |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>                   |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                                                                                   |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                                                                                           |
| <b>Week 1</b>                                                            | <ul style="list-style-type: none"> <li>Introduction to the chemistry of transition elements, some of their periodic properties, states</li> </ul> |

|                |                                                                                                                                                                                                                      |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                                                                                                                                                                                                      |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>• Oxidation of transition elements, coordination numbers,</li> </ul>                                                                                                          |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>• types of ligands, and naming coordination complexes.</li> </ul>                                                                                                             |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>• A historical overview of the development of coordination chemistry, string theory, Werner's theory</li> </ul>                                                               |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>• Effective atomic number theory, valence bond theory, hybridization of atomic orbitals, crystal field theory.</li> </ul>                                                     |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>• First exam.</li> </ul>                                                                                                                                                      |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>• The stabilization energy of the crystal field for high-spin and low-spin complexes, a comparison between the valence string theory and the crystal field theory.</li> </ul> |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>• Molecular orbital theory</li> </ul>                                                                                                                                         |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>• Spectral properties of complexes</li> <li>•</li> </ul>                                                                                                                      |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>• Magnetic properties of complexes</li> <li>• .</li> </ul>                                                                                                                    |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>• Methods of preparing complexes, substitution reactions in aqueous solvents and in their absence,</li> <li>•</li> </ul>                                                      |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>• Oxidation and reduction reactions,</li> </ul>                                                                                                                               |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>• mechanism of substitution of ligands (SN1, SN2).</li> </ul>                                                                                                                 |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>• Second Exam.</li> </ul>                                                                                                                                                     |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>• thermal dissociation reactions of complexes.</li> </ul>                                                                                                                     |
| <b>Week 16</b> |                                                                                                                                                                                                                      |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                               |
|--------------------------------------------------------------------------------|---------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                       |
| <b>Week 1</b>                                                                  | Hazards of chemicals, and safety tips in the first laboratory |
| <b>Week 2</b>                                                                  | Preparation of potassium dioxalate and dihydrochrome (III) II |
| <b>Week 3</b>                                                                  | Preparation of triasthenitomanganese (III) III                |
| <b>Week 4</b>                                                                  | Iron Chemistry IV                                             |
| <b>Week 5</b>                                                                  | Preparation of iron complex with phenanthroline V             |
| <b>Week 6</b>                                                                  | Preparation of potassium ferrite trioxalate VI                |

|        |            |
|--------|------------|
| Week 7 | First test |
|--------|------------|

## Learning and Teaching Resources

### مصادر التعلم والتدريس

- 1- د. نعمان النعيمي "الكيمياء اللاعضوية" الجزء الأول والثاني ، مطبعة جامعة بغداد ، 1978.  
 د. أحسان عبد الغني مصطفى " الكيمياء اللاعضوية والتناسقية" ، مطبعة جامعة الموصل ، 1988.  
 2- د. باسم محمد سعيد " الكيمياء اللاعضوية العملي " ، مطبعة جامعة الموصل ، 1987.

- 3- P.J.Durrant " General and inorganic chemistry" , 3rd edition, Dai Nippon Printing Co(H.K) Ltd, 1964  
 4- J.D. Lee " Consice inorganic chemistry", 1970  
 5- M.R.Wright " An Introduction to Aqueous Electrolyte Solution" , John wiley and sons, 2007

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                           |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information      |                       |  |                      |                                                              |
|-------------------------|-----------------------|--|----------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية |                       |  |                      |                                                              |
| Module Title            | Inorganic Chemistry-2 |  |                      | Module Delivery                                              |
| Module Type             | C                     |  |                      | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code             |                       |  |                      |                                                              |
| ECTS Credits            | 3.00                  |  |                      |                                                              |
| SWL (hr/sem)            | 150                   |  |                      |                                                              |
| Module Level            |                       |  | Semester of Delivery |                                                              |

|                             |                |                |                               |
|-----------------------------|----------------|----------------|-------------------------------|
| Administering Department    |                | College        |                               |
| Module Leader               | Suad Taha Saad | e-mail         |                               |
| Module Leader's Acad. Title |                | Assist.Prof.   | Module Leader's Qualification |
|                             |                |                | Ph.D.                         |
| Module Tutor                |                | e-mail         | None                          |
| Peer Reviewer Name          |                | e-mail         |                               |
| Review Committee Approval   |                | Version Number | 1.0                           |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |  |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                               | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                               | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |  |
| Module Aims<br>أهداف المادة الدراسية                                                                               | <p>The course aims to:</p> <p>The course aims to introduce the student to theoretical inorganic chemistry by identifying the elements of the periodic table under study.</p> <p>7- Distinguish between transitional elements through their periodic properties.</p> <p>8- Interpreting complexes through different theories of association.</p> <p>9- Interpreting the complex spectra of these elements and benefiting from that practically.</p> |          |  |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | <p>28. It is well known that Coordination chemistry is the main subject in chemistry which mean it can be taken in all types of chemistry.</p> <p>29. Students are able to prepare the accurate concentration for the solutions in any lab they do experiment.</p>                                                                                                                                                                                 |          |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | 30. Students can handle the chemicals with good experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 8. Coordination chemistry specializes in the study of coordination compounds or metal complexes. The complex compound consists of the union of an atom or a central ion with one or more ligands (negative or positive ions or neutral molecules). The properties of the resulting complex differ completely from the properties of any of its components. Coordination chemistry is also concerned with studying theories of interpretation. Coordination compounds, methods of preparing them, stabilization, and mechanics of their interactions. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                            |    |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                            |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |             |                |          |                           |
|---------------------------------------------------|--------------------|-------------|----------------|----------|---------------------------|
|                                                   |                    | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>     | 2           | 10% (10)       | 5, 10    | LO #1, 2, 10 and 11       |
|                                                   | <b>Assignments</b> | 2           | 10% (10)       | 2, 12    | LO # 3, 4, 6 and 7        |

|                             |                        |      |                  |            |                  |
|-----------------------------|------------------------|------|------------------|------------|------------------|
|                             | <b>Projects / Lab.</b> | 1    | 10% (10)         | Continuous |                  |
|                             | <b>Report</b>          | 1    | 10% (10)         | 13         | LO # 5, 8 and 10 |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr | 10% (10)         | 7          | LO # 1-7         |
|                             | <b>Final Exam</b>      | 2hr  | 50% (50)         | 16         | All              |
| <b>Total assessment</b>     |                        |      | 100% (100 Marks) |            |                  |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | Material Covered                                                                                                                                                                                                   |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>Introduction to the chemistry of transition elements, some of their periodic properties, states</li> </ul>                                                                  |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>Oxidation of transition elements, coordination numbers,</li> </ul>                                                                                                          |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>types of ligands, and naming coordination complexes.</li> </ul>                                                                                                             |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>A historical overview of the development of coordination chemistry, string theory, Werner's theory</li> </ul>                                                               |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>Effective atomic number theory, valence bond theory, hybridization of atomic orbitals, crystal field theory.</li> </ul>                                                     |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                                                      |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>The stabilization energy of the crystal field for high-spin and low-spin complexes, a comparison between the valence string theory and the crystal field theory.</li> </ul> |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>Molecular orbital theory</li> </ul>                                                                                                                                         |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Spectral properties of complexes</li> <li>.</li> </ul>                                                                                                                      |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>Magnetic properties of complexes</li> <li>.</li> </ul>                                                                                                                      |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>Methods of preparing complexes, substitution reactions in aqueous solvents and in their absence,</li> <li>.</li> </ul>                                                      |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>Oxidation and reduction reactions,</li> </ul>                                                                                                                               |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>mechanism of substitution of ligands (SN1, SN2).</li> </ul>                                                                                                                 |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>                                                                                                                                                     |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>thermal dissociation reactions of complexes.</li> </ul>                                                                                                                     |
| <b>Week 16</b> |                                                                                                                                                                                                                    |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                                               |
|------------------------------------------------------------------|---------------------------------------------------------------|
|                                                                  | Material Covered                                              |
| Week 1                                                           | Hazards of chemicals, and safety tips in the first laboratory |
| Week 2                                                           | Preparation of potassium dioxalate and dihydrochrome (III) II |
| Week 3                                                           | Preparation of triasthenitomanganese (III) III                |
| Week 4                                                           | Iron Chemistry IV                                             |
| Week 5                                                           | Preparation of iron complex with phenanthroline V             |
| Week 6                                                           | Preparation of potassium ferrite trioxalate VI                |
| Week 7                                                           | First test                                                    |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
| <p>د. نعمان النعيمي "الكيمياء اللاعضوية" الجزء الأول و الثاني ، مطبعة جامعة بغداد ، 1978.</p> <p>1- د. أحسان عبد الغني مصطفى " الكيمياء اللاعضوية والتناسقية " ، مطبعة جامعة الموصل ، 1988.</p> <p>2- د. باسم محمد سعيد " الكيمياء اللاعضوية العملي " ، مطبعة جامعة الموصل ، 1987.</p> <p>3- P.J.Durrant " General and inorganic chemistry" , 3rd edition, Dai Nippon Printing Co(H.K) Ltd, 1964</p> <p>4- J.D. Lee " Consice inorganic chemistry", 1970</p> <p>5- M.R.Wright " An Introduction to Aqueos Electrolyte Solution" , John wiley and sons, 2007</p> |      |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | yes                       |
| Recommended Texts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | No                        |
| Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                           |

#### APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |               |         |           |                                |
|--------------------------------|---------------|---------|-----------|--------------------------------|
| Group                          | Grade         | التقدير | Marks (%) | Definition                     |
| Success Group<br>(50 - 100)    | A - Excellent | امتياز  | 90 - 100  | Outstanding Performance        |
|                                | B - Very Good | جيد جدا | 80 - 89   | Above average with some errors |



|                                |                  |             |         |                                       |
|--------------------------------|------------------|-------------|---------|---------------------------------------|
|                                | C - Good         | جيد         | 70 - 79 | Sound work with notable errors        |
|                                | D - Satisfactory | متوسط       | 60 - 69 | Fair but with major shortcomings      |
|                                | E - Sufficient   | مقبول       | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b> | FX – Fail        | مقبول بقرار | (45-49) | More work required but credit awarded |
|                                | F – Fail         | راسب        | (0-44)  | Considerable amount of work required  |
|                                |                  |             |         |                                       |

**Note:**

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54). The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                               |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                    |                               |                                                              |      |
|-----------------------------|--------------------|-------------------------------|--------------------------------------------------------------|------|
| معلومات المادة الدراسية     |                    |                               |                                                              |      |
| Module Title                | English Language-3 |                               | Module Delivery                                              |      |
| Module Type                 | S                  |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |      |
| Module Code                 |                    |                               |                                                              |      |
| ECTS Credits                | 2.00               |                               |                                                              |      |
| SWL (hr/sem)                | 150                |                               |                                                              |      |
| Module Level                |                    | Semester of Delivery          |                                                              |      |
| Administering Department    |                    | College                       |                                                              |      |
| Module Leader               | Ahmed Rodan        |                               | e-mail                                                       |      |
| Module Leader's Acad. Title | Assist. Prof.      | Module Leader's Qualification |                                                              | Ph.D |
| Module Tutor                |                    | e-mail                        | None                                                         |      |
| Peer Reviewer Name          |                    | e-mail                        |                                                              |      |
| Review Committee Approval   |                    | Version Number                | 1.0                                                          |      |

| Relation with Other Modules                              |                                                                                                                                                                                  |          |  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                                                                                                  |          |  |
| Prerequisite module                                      | None                                                                                                                                                                             | Semester |  |
| Co-requisites module                                     | None                                                                                                                                                                             | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                  |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                  |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | <p>The course aims to:</p> <p>1- Explaining the material in a clear and understandable way for all students.</p> <p>2. Involve students in discussing and solving exercises.</p> |          |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | 3- Explaining the study material using various methods<br>An explanation to develop students' abilities and break boredom in the classroom                                                                                                                                                                                                   |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية       | 31.The student's understanding of the material<br>32.The ability to analyze and apply what you have learned practically on the English<br>33.The evaluation should be done by presenting the material to the students in the laboratory and then applying it                                                                                 |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 9. The theoretical method and explanation is by presenting the material on the Point Power program in the form of diagrams and pictures<br>10.This is to attract the student's attention and help him not feel bored. The practical method is to apply what has been presented<br>11.On the calculator and conduct daily and monthly exams.. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                              |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                              |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |             |                |          |                           |
|---------------------------------------------------|-------------|----------------|----------|---------------------------|
|                                                   | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |

|                             |                        |      |                  |            |                     |
|-----------------------------|------------------------|------|------------------|------------|---------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2    | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11 |
|                             | <b>Assignments</b>     | 2    | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7  |
|                             | <b>Projects / Lab.</b> | 1    | 10% (10)         | Continuous |                     |
|                             | <b>Report</b>          | 1    | 10% (10)         | 13         | LO # 5, 8 and 10    |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr | 10% (10)         | 7          | LO # 1-7            |
|                             | <b>Final Exam</b>      | 2hr  | 50% (50)         | 16         | All                 |
| <b>Total assessment</b>     |                        |      | 100% (100 Marks) |            |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | Material Covered                                                                                               |
|----------------|----------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>The concept of ecology and its connection with other science</li> </ul> |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>Naming tenses, present past and present perfect The first</li> </ul>    |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>Present simple tenses and conditions The second</li> </ul>              |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>Past tenses Third</li> </ul>                                            |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>Advice obligation and permission Fourth</li> </ul>                      |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>Future forms</li> </ul>                                                 |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>Information questions Sixth</li> </ul>                                  |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>Reported swim</li> </ul>                                                |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Passion and fashions</li> </ul>                                         |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>First Exam.</li> </ul>                                                  |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>Verb patterns ninth</li> </ul>                                          |
| <b>Week 12</b> | Conditionals                                                                                                   |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>Second month exam.</li> </ul>                                           |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Noun phrases</li> </ul>                                                 |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>Models of probability second tenth</li> </ul>                           |
| <b>Week 16</b> |                                                                                                                |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|               | Material Covered          |
|---------------|---------------------------|
| <b>Week 1</b> | لايوجد عملي في هذه المادة |

|        |  |
|--------|--|
| Week 2 |  |
| Week 3 |  |
| Week 4 |  |
| Week 5 |  |
| Week 6 |  |
| Week 7 |  |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

Stern, H.H. (1992). Issues and options in language teaching (edited posthumously by Patrick Allen & Birgit Harley). Oxford: Oxford University Press. Ur, P. (1996). A Course in Language Teaching. Cambridge: Cambridge University Press. Vermes, A. (2010). Translation in foreign language teaching: A brief overview of pros and cons, Eger, Journal of English Studies, 10, 83-93.

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

#### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                             |                  |             |           |                                       |
| Note:                       |                  |             |           |                                       |

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                               |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| <b>Module Information</b><br>معلومات المادة الدراسية |                       |                        |
|------------------------------------------------------|-----------------------|------------------------|
| <b>Module Title</b>                                  | <b>Nanotechnology</b> | <b>Module Delivery</b> |

|                             |               |                                                              |      |      |  |
|-----------------------------|---------------|--------------------------------------------------------------|------|------|--|
| Module Type                 | B             | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |      |      |  |
| Module Code                 |               |                                                              |      |      |  |
| ECTS Credits                | 2.00          |                                                              |      |      |  |
| SWL (hr/sem)                | 150           |                                                              |      |      |  |
| Module Level                |               | Semester of Delivery                                         |      |      |  |
| Administering Department    |               | College                                                      |      |      |  |
| Module Leader               | Ayad Mohammed | e-mail                                                       |      |      |  |
| Module Leader's Acad. Title | Prof.         | Module Leader's Qualification                                |      | Ph.D |  |
| Module Tutor                |               | e-mail                                                       | None |      |  |
| Peer Reviewer Name          |               | e-mail                                                       |      |      |  |
| Review Committee Approval   |               | Version Number                                               | 1.0  |      |  |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                     |          |  |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                     |          |  |
| Module Aims<br>أهداف المادة الدراسية                                                                               | <p>The course aims to:</p> <p>1- Developing students' ability to understand the characteristics of the nanotechnology, types of nanotechnology,</p> <p>2- Providing students with the knowledge and ideas to identify the most important sources for obtaining nanotechnology</p> <p>3. Enabling students to understand the basic rules of the nanotechnology .</p> |          |  |
| Module Learning Outcomes                                                                                           | <p>34. That students become familiar with nanotechnology scientists.</p> <p>35. For students to distinguish between the main type of</p>                                                                                                                                                                                                                            |          |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| مخرجات التعلم للمادة الدراسية                                          | nanotechnology                                                                                                                                                                                                                                                                                                 |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 12.The course aims for the department's students to acquire information and skills that will make them able to understand industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                            |    |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                            |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|---------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                   |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                   | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                   | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                   | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                   | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                           |                        |             | 100% (100 Marks) |            |                           |



### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|         | Material Covered                                                                                 |
|---------|--------------------------------------------------------------------------------------------------|
| Week 1  | <ul style="list-style-type: none"> <li>A historical overview of nanotechnology.</li> </ul>       |
| Week 2  | <ul style="list-style-type: none"> <li>Basics of nanotechnology</li> </ul>                       |
| Week 3  | <ul style="list-style-type: none"> <li>Types of nanotechnology depending on the shape</li> </ul> |
| Week 4  | <ul style="list-style-type: none"> <li>What do we mean by nanotechnology</li> </ul>              |
| Week 5  | <ul style="list-style-type: none"> <li>Devices used to study nanotechnology</li> </ul>           |
| Week 6  | <ul style="list-style-type: none"> <li>Nanotechnology preparation</li> </ul>                     |
| Week 7  | <ul style="list-style-type: none"> <li>Characteristics of nanocomposites</li> </ul>              |
| Week 8  | <ul style="list-style-type: none"> <li>First exam</li> </ul>                                     |
| Week 9  | <ul style="list-style-type: none"> <li>Physical methods for preparing nanotechnology</li> </ul>  |
| Week 10 | <ul style="list-style-type: none"> <li>Chemical methods for preparing nanotechnology.</li> </ul> |
| Week 11 | <ul style="list-style-type: none"> <li>Applications of nanotechnology in industry</li> </ul>     |
| Week 12 | <ul style="list-style-type: none"> <li>Applications of nanotechnology in medicine</li> </ul>     |
| Week 13 | <ul style="list-style-type: none"> <li>Second month exam.</li> </ul>                             |
| Week 14 | <ul style="list-style-type: none"> <li>Applications of nanotechnology in electronics</li> </ul>  |
| Week 15 | <ul style="list-style-type: none"> <li>Military nanotechnology applications</li> </ul>           |
| Week 16 |                                                                                                  |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered           |
|--------|----------------------------|
| Week 1 | لا يوجد عملي في هذه المادة |
| Week 2 |                            |
| Week 3 |                            |
| Week 4 |                            |
| Week 5 |                            |
| Week 6 |                            |

|        |  |
|--------|--|
| Week 7 |  |
|--------|--|

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b>                                          |      |                           |
|-----------------------------------------------------------------------------------------------------------------|------|---------------------------|
| NANOTECHNOLOGY A COMPLETE GUIDE - 2020 EDITION PAPERBACK – MARCH 8, 2021<br><a href="#">Gerardus Blokdyk</a> by |      |                           |
|                                                                                                                 | Text | Available in the Library? |
| Required Texts                                                                                                  |      | yes                       |
| Recommended Texts                                                                                               |      | No                        |
| Websites                                                                                                        |      |                           |

#### APPENDIX:

| <b>GRADING SCHEME</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                         |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                  | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                       | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                           |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information       |               |  |                                                              |  |  |
|--------------------------|---------------|--|--------------------------------------------------------------|--|--|
| معلومات المادة الدراسية  |               |  |                                                              |  |  |
| Module Title             | Environmental |  | Module Delivery                                              |  |  |
| Module Type              | B             |  | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |  |
| Module Code              |               |  |                                                              |  |  |
| ECTS Credits             | 2.00          |  |                                                              |  |  |
| SWL (hr/sem)             | 150           |  |                                                              |  |  |
| Module Level             |               |  | Semester of Delivery                                         |  |  |
| Administering Department |               |  | College                                                      |  |  |

|                                    |                      |                                      |      |
|------------------------------------|----------------------|--------------------------------------|------|
| <b>Module Leader</b>               | <b>Zainab Hashim</b> | <b>e-mail</b>                        |      |
| <b>Module Leader's Acad. Title</b> | Assist. Prof.        | <b>Module Leader's Qualification</b> | Ph.D |
| <b>Module Tutor</b>                |                      | <b>e-mail</b>                        | None |
| <b>Peer Reviewer Name</b>          |                      | <b>e-mail</b>                        |      |
| <b>Review Committee Approval</b>   |                      | <b>Version Number</b>                | 1.0  |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Developing students' ability to understand the characteristics of the environment, pollution, types of pollutants, their causes, and treatments within the real environment.<br><br>2- Providing students with the knowledge and ideas to identify the most important sources for obtaining environmental geographic data Including data available at the Ministry of Health, Environment and Meteorology and the Central Bureau of Statistics as well About books and references regarding the subject.<br>3. Enabling students to understand the basic rules of the environment and activating its role in its development on the ground. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 36. That students become familiar with environmental and pollution scientists.<br>37. For students to distinguish between the main and secondary concentrations of pollutants and how to find immediate treatments as temporary solutions to the problem.                                                                                                                                                                                                                                                                                                                                                                                                             |                 |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>38.Students should differentiate between geography and environmental science.</p> <p>39.Enabling students to write research in the field of environment and pollution.</p> <p>40.For students to write about the most important sources of environmental science.</p> <p>41.Enabling students to discuss and explain the importance of the environment in their lives.</p> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <p>13.The course aims for the department's students to acquire information and skills that will make them able to understand industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories.</p>                                                         |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                               |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |             |                |          |                           |
|---------------------------------------------------|--------------------|-------------|----------------|----------|---------------------------|
|                                                   |                    | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>     | 2           | 10% (10)       | 5, 10    | LO #1, 2, 10 and 11       |
|                                                   | <b>Assignments</b> | 2           | 10% (10)       | 2, 12    | LO # 3, 4, 6 and 7        |

|                             |                        |      |                  |            |                  |
|-----------------------------|------------------------|------|------------------|------------|------------------|
|                             | <b>Projects / Lab.</b> | 1    | 10% (10)         | Continuous |                  |
|                             | <b>Report</b>          | 1    | 10% (10)         | 13         | LO # 5, 8 and 10 |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr | 10% (10)         | 7          | LO # 1-7         |
|                             | <b>Final Exam</b>      | 2hr  | 50% (50)         | 16         | All              |
| <b>Total assessment</b>     |                        |      | 100% (100 Marks) |            |                  |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | Material Covered                                                                                                                         |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>The concept of ecology and its connection with other sciences</li> </ul>                          |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>Knowledge of the branches of ecology, which include 1- Aquatic ecology 2- Land ecology</li> </ul> |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>The concept of the ecosystem and the structure of the ecosystem</li> </ul>                        |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>Identify the abiotic and biotic components</li> </ul>                                             |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>Identify the geochemical and life cycles</li> </ul>                                               |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>Learn about the water cycle in nature</li> </ul>                                                  |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>Identify the carbon cycle in nature</li> </ul>                                                    |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>Identify the sulfur cycle in nature</li> </ul>                                                    |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>Identify the path of the phosphorus cycle in nature</li> </ul>                                    |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>First Exam.</li> </ul>                                                                            |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>Identify the concept of pollution and its impact on health</li> </ul>                             |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>Identify air pollution</li> </ul>                                                                 |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>Second month exam.</li> </ul>                                                                     |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Identifying water pollution</li> <li>Identify soil pollution</li> </ul>                           |
| <b>Week 15</b> | Identify the risks of population growth and its impact on the environment                                                                |
| <b>Week 16</b> |                                                                                                                                          |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                            |
|------------------------------------------------------------------|----------------------------|
|                                                                  | Material Covered           |
| Week 1                                                           | لا يوجد عملي في هذه المادة |
| Week 2                                                           |                            |
| Week 3                                                           |                            |
| Week 4                                                           |                            |
| Week 5                                                           |                            |
| Week 6                                                           |                            |
| Week 7                                                           |                            |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس                                                                                                                                                                                                                                        |      |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
| 1-Anonymous.(2003).An Introductions to modified food starch<br>2-chia.LL.(2003).Purification of laboratory chemicals.<br>3-Cary coyne(1997) . chemistry and the chemical<br>4-Frank,M.dunnivat.(2004).Enviromental laboratory excexcises for industriment analysis and environmental chemistry. |      |                           |
|                                                                                                                                                                                                                                                                                                 | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                                                                                  |      | yes                       |
| Recommended Texts                                                                                                                                                                                                                                                                               |      | No                        |
| Websites                                                                                                                                                                                                                                                                                        |      |                           |

#### APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |               |         |           |                         |
|--------------------------------|---------------|---------|-----------|-------------------------|
| Group                          | Grade         | التقدير | Marks (%) | Definition              |
| Success Group                  | A - Excellent | امتياز  | 90 - 100  | Outstanding Performance |

|                        |                  |             |         |                                       |
|------------------------|------------------|-------------|---------|---------------------------------------|
| (50 - 100)             | B - Very Good    | جيد جدا     | 80 - 89 | Above average with some errors        |
|                        | C - Good         | جيد         | 70 - 79 | Sound work with notable errors        |
|                        | D - Satisfactory | متوسط       | 60 - 69 | Fair but with major shortcomings      |
|                        | E - Sufficient   | مقبول       | 50 - 59 | Work meets minimum criteria           |
| Fail Group<br>(0 – 49) | FX – Fail        | مقبول بقرار | (45-49) | More work required but credit awarded |
|                        | F – Fail         | راسب        | (0-44)  | Considerable amount of work required  |
|                        |                  |             |         |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي





Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Biology



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                         |                               |                                                              |
|-----------------------------|-------------------------|-------------------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية     |                         |                               |                                                              |
| Module Title                | Instrumental chemistry1 |                               | Module Delivery                                              |
| Module Type                 | C                       |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code                 |                         |                               |                                                              |
| ECTS Credits                | 3.00                    |                               |                                                              |
| SWL (hr/sem)                | 150                     |                               |                                                              |
| Module Level                |                         | Semester of Delivery          |                                                              |
| Administering Department    |                         | College                       |                                                              |
| Module Leader               | Aseal Mushtaq           | e-mail                        |                                                              |
| Module Leader's Acad. Title | Assist.Prof.            | Module Leader's Qualification | Ph.D.                                                        |
| Module Tutor                |                         | e-mail                        | None                                                         |
| Peer Reviewer Name          |                         | e-mail                        |                                                              |
| Review Committee Approval   |                         | Version Number                | 1.0                                                          |

| Relation with Other Modules                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |  |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |  |
| Prerequisite module                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Semester |  |
| Co-requisites module                                             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                      | <p>The course aims to:</p> <p>The tremendous development in modern analysis techniques has led to a major qualitative change in the tasks of the chemical analyst. The accuracy, speed, and reliability of the new devices made chemistry break into many fields that were previously impossible. The mission of the current course is to introduce the student to the most important recent developments in the field of chemical analysis and to provide him with the necessary practical experience in using various techniques to make him a pioneering element in the process of solid scientific construction of the country.</p>                                                                                                                                                                                                                                                                                                                                  |          |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <ol style="list-style-type: none"> <li>1. The course objective is to introduce the students to modern instrumental techniques and analytical approaches within Chemical analysis, environmental and soil chemistry, food chemistry and plant biology.</li> <li>2. After completing the course the student should be able to:</li> <li>3. Knowledge:</li> <li>4. Describe the theory of sampling, sample preparation and sample preparation techniques.</li> <li>5. Refer to the chemical theory behind the use of modern instrumental techniques for quantitative chemical analysis.</li> <li>6. Describe how to identify unknown compounds by spectroscopy and mass spectrometry and to measure their concentration in environmental and food samples.</li> <li>7. Skills:</li> <li>8. Develop and apply methods for separating chemical compounds in mixtures using chromatography.</li> <li>9. Perform quantitative chemical analysis of organic compounds</li> </ol> |          |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>and metals.</p> <p>10. Apply solid data processing and evaluation of analytical data.</p> <p>11. Competences:</p> <p>12. Develop, validate and apply analytical methods in different field of research</p> <p>13. Evaluate and discuss analytical chemical data from the literature.</p> <p>14. Do problem solving in analytical chemistry.</p> <p>.</p>                                                                                                                                              |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <ol style="list-style-type: none"> <li>1. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</li> <li>2.</li> <li>3. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</li> </ol> |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                               |             |                  |            |                           |
|----------------------------------------------------------|-------------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                               | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>                | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>            | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab. Report</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>                 | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>           | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>             | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                               |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                      |
|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                              |
| <b>Week 1</b>                                                            | Introduction to analytical chemistry<br>Choosing the analysis method |
| <b>Week 2</b>                                                            | An introduction to spectroscopic method                              |
| <b>Week 3</b>                                                            | Solution of problems and discussion                                  |
| <b>Week 4</b>                                                            | Interaction of radiation and matter                                  |
| <b>Week 5</b>                                                            | Molecular absorption                                                 |
| <b>Week 6</b>                                                            | First exam                                                           |
| <b>Week 7</b>                                                            | Beer's law                                                           |
| <b>Week 8</b>                                                            | Problem solutions and discussion                                     |
| <b>Week 9</b>                                                            | Optical spectroscopic instruments                                    |
| <b>Week 10</b>                                                           | Types of monochromators                                              |
| <b>Week 11</b>                                                           | Radiation detectors                                                  |
| <b>Week 12</b>                                                           | Photometers                                                          |
| <b>Week 13</b>                                                           | Spectrophotometers                                                   |

|                |                                  |
|----------------|----------------------------------|
| <b>Week 14</b> | Problems solution and discussion |
| <b>Week 15</b> | Second exam                      |
| <b>Week 16</b> |                                  |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                             |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                                     |
| <b>Week 1</b>                                                                  | Determine the maximum absorption wavelength ( $\lambda_{\max}$ ) of a permanganate solution |
| <b>Week 2</b>                                                                  | Determine the pH of acid and base solution                                                  |
| <b>Week 3</b>                                                                  | Gas chromatography                                                                          |
| <b>Week 4</b>                                                                  | Paper chromatography                                                                        |
| <b>Week 5</b>                                                                  | Flame Photometry                                                                            |
| <b>Week 6</b>                                                                  | Absorption and Emission Spectrometry                                                        |
| <b>Week 7</b>                                                                  | Exam                                                                                        |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b>                                                                                                                                                                                                                                                                                                                             |             |                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------|
| "D. A. Skoog, F. J. Holler, T. A. Niemann, "Principles of Instrumental Analysis<br>.Thompson, Brooks, Cole, 6th Edition, 2007<br><br>.Harris, D.C. Quantitative Chemical Analysis, 7th Edition, W.H. Freeman, New York, 2007<br>G.H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, "Vogels Textbook of Quantitative Chemical Analysis" Fifth<br>.Edition, Longman Scientific & Technical, 1989 |             |                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Text</b> | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                                                                                                                                                                                                                                                                                                                                              |             | yes                              |
| <b>Recommended Texts</b>                                                                                                                                                                                                                                                                                                                                                                           |             | No                               |
| <b>Websites</b>                                                                                                                                                                                                                                                                                                                                                                                    |             |                                  |

## APPENDIX:

| <b>GRADING SCHEME</b> |
|-----------------------|
|-----------------------|

| مخطط الدرجات                |                  |             |           |                                       |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                             |                  |             |           |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Biology



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                         |                               |                                                              |  |
|-----------------------------|-------------------------|-------------------------------|--------------------------------------------------------------|--|
| معلومات المادة الدراسية     |                         |                               |                                                              |  |
| Module Title                | Instrumental chemistry2 |                               | Module Delivery                                              |  |
| Module Type                 | C                       |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |
| Module Code                 |                         |                               |                                                              |  |
| ECTS Credits                | 3.00                    |                               |                                                              |  |
| SWL (hr/sem)                | 150                     |                               |                                                              |  |
| Module Level                |                         | Semester of Delivery          |                                                              |  |
| Administering Department    |                         | College                       |                                                              |  |
| Module Leader               | Aseal Mushtaq           |                               | e-mail                                                       |  |
| Module Leader's Acad. Title | Assist.Prof.            | Module Leader's Qualification | Ph.D.                                                        |  |
| Module Tutor                |                         | e-mail                        | None                                                         |  |
| Peer Reviewer Name          |                         | e-mail                        |                                                              |  |
| Review Committee Approval   |                         | Version Number                | 1.0                                                          |  |

### Relation with Other Modules

العلاقة مع المواد الدراسية الأخرى

|                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| Co-requisites module                                                                                                             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Module Aims</b><br><b>أهداف المادة الدراسية</b>                                                                               | <p>The course aims to:</p> <p>The tremendous development in modern analysis techniques has led to a major qualitative change in the tasks of the chemical analyst. The accuracy, speed, and reliability of the new devices made chemistry break into many fields that were previously impossible. The mission of the current course is to introduce the student to the most important recent developments in the field of chemical analysis and to provide him with the necessary practical experience in using various techniques to make him a pioneering element in the process of solid scientific construction of the country.</p>                                                                                                                                                                                                                                                                                                                                                                      |          |  |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p>15. The course objective is to introduce the students to modern instrumental techniques and analytical approaches within Chemical analysis, environmental and soil chemistry, food chemistry and plant biology.</p> <p>16. After completing the course the student should be able to:</p> <p>17. Knowledge:</p> <p>18. Describe the theory of sampling, sample preparation and sample preparation techniques.</p> <p>19. Refer to the chemical theory behind the use of modern instrumental techniques for quantitative chemical analysis.</p> <p>20. Describe how to identify unknown compounds by spectroscopy and mass spectrometry and to measure their concentration in environmental and food samples.</p> <p>21. Skills:</p> <p>22. Develop and apply methods for separating chemical compounds in mixtures using chromatography.</p> <p>23. Perform quantitative chemical analysis of organic compounds and metals.</p> <p>24. Apply solid data processing and evaluation of analytical data.</p> |          |  |



|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>25.Competences:</p> <p>26.Develop, validate and apply analytical methods in different field of research</p> <p>27.Evaluate and discuss analytical chemical data from the literature.</p> <p>28. Do problem solving in analytical chemistry.</p>                                                                                                                                                                                                       |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <p>4. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</p> <p>5.</p> <p>6. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis.</p> |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |             |                |          |                           |
|---------------------------------------------------|-------------|----------------|----------|---------------------------|
|                                                   | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |

|                             |                        |      |                  |            |                     |
|-----------------------------|------------------------|------|------------------|------------|---------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2    | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11 |
|                             | <b>Assignments</b>     | 2    | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7  |
|                             | <b>Projects / Lab.</b> | 1    | 10% (10)         | Continuous |                     |
|                             | <b>Report</b>          | 1    | 10% (10)         | 13         | LO # 5, 8 and 10    |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr | 10% (10)         | 7          | LO # 1-7            |
|                             | <b>Final Exam</b>      | 2hr  | 50% (50)         | 16         | All                 |
| <b>Total assessment</b>     |                        |      | 100% (100 Marks) |            |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|                | <b>Material Covered</b>                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | Principles of separation operations Separation by sedimentation Extraction methods                                                                                                                                                                      |
| <b>Week 2</b>  | Extraction applications Ion exchange                                                                                                                                                                                                                    |
| <b>Week 3</b>  | Introduction to separation chromatography General description of the chromatography device<br>Velocity theory in chromatography Separation columns, detection and analysis devices<br>Qualitative and quantitative analysis by chromatographic analysis |
| <b>Week 4</b>  | Liquid chromatography                                                                                                                                                                                                                                   |
| <b>Week 5</b>  | Ultra-performance liquid chromatography principles and applications                                                                                                                                                                                     |
| <b>Week 6</b>  | First exam                                                                                                                                                                                                                                              |
| <b>Week 7</b>  | Principles of electromigration<br>The mechanical method, working conditions and preparation<br>Factors affecting separation processes<br>Applications of electromigration                                                                               |
| <b>Week 8</b>  | Microscopic analysis of elements C, N, H, O and S                                                                                                                                                                                                       |
| <b>Week 9</b>  | The jihadist method General principles<br>Hydrogen electrode Selective electrodes the accounts                                                                                                                                                          |
| <b>Week 10</b> | Voltammetric and coulombic analysis methods                                                                                                                                                                                                             |
| <b>Week 11</b> | Principles of anodic dislocation                                                                                                                                                                                                                        |
| <b>Week 12</b> | Static (stable) jihadism Coulometric                                                                                                                                                                                                                    |
| <b>Week 13</b> | Ampere calibration                                                                                                                                                                                                                                      |
| <b>Week 14</b> | Thermogravimetric analysis, Mechanisms and applications                                                                                                                                                                                                 |
| <b>Week 15</b> | Second exam                                                                                                                                                                                                                                             |
| <b>Week 16</b> |                                                                                                                                                                                                                                                         |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered                                                                         |
|--------|------------------------------------------------------------------------------------------|
| Week 1 | Thin layer chromatography Salvage of separated materials by plastering technique         |
| Week 2 | Specific diagnosis of alcohols using chromatography                                      |
| Week 3 | applications of gas chromatography, such as separating petroleum components              |
| Week 4 | Analysis of the elements carbon, hydrogen, oxygen, and nitrogen using gas chromatography |
| Week 5 | Determination of copper using gravimetric electrolysis at constant current               |
| Week 6 | Coulomb titration of cyclohexane with bromine                                            |
| Week 7 | Exam                                                                                     |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

،"D. A. Skoog, F. J. Holler, T. A. Niemann, "Principles of Instrumental Analysis  
.Thompson, Brooks, Cole, 6th Edition, 2007

.Harris, D.C. Quantitative Chemical Analysis, 7th Edition, W.H. Freeman, New York, 2007

G.H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, "Vogels Textbook of Quantitative Chemical Analysis" Fifth  
Edition, Longman Scientific & Technical, 1989

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

#### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير | Marks (%) | Definition                       |
|-----------------------------|------------------|---------|-----------|----------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز  | 90 - 100  | Outstanding Performance          |
|                             | B - Very Good    | جيد جدا | 80 - 89   | Above average with some errors   |
|                             | C - Good         | جيد     | 70 - 79   | Sound work with notable errors   |
|                             | D - Satisfactory | متوسط   | 60 - 69   | Fair but with major shortcomings |

|                        |                |             |         |                                       |
|------------------------|----------------|-------------|---------|---------------------------------------|
|                        | E - Sufficient | مقبول       | 50 - 59 | Work meets minimum criteria           |
| Fail Group<br>(0 – 49) | FX – Fail      | مقبول بقرار | (45-49) | More work required but credit awarded |
|                        | F – Fail       | راسب        | (0-44)  | Considerable amount of work required  |
|                        |                |             |         |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                               |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                         |       |                                                              |      |
|-----------------------------|-------------------------|-------|--------------------------------------------------------------|------|
| معلومات المادة الدراسية     |                         |       |                                                              |      |
| Module Title                | Clinical biochemistry-2 |       | Module Delivery                                              |      |
| Module Type                 | C                       |       | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |      |
| Module Code                 |                         |       |                                                              |      |
| ECTS Credits                | 3.00                    |       |                                                              |      |
| SWL (hr/sem)                | 150                     |       |                                                              |      |
| Module Level                |                         |       | Semester of Delivery                                         |      |
| Administering Department    |                         |       | College                                                      |      |
| Module Leader               | Talat Tariq             |       | e-mail                                                       |      |
| Module Leader's Acad. Title |                         | Prof. | Module Leader's Qualification                                |      |
|                             |                         |       | Ph.D.                                                        |      |
| Module Tutor                |                         |       | e-mail                                                       | None |
| Peer Reviewer Name          |                         |       | e-mail                                                       |      |
| Review Committee Approval   |                         |       | Version Number                                               | 1.0  |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                    |          |  |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                               | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                               | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                    |          |  |
| Module Aims<br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1. Knowing life energy and how it is liberated and transmitted.<br>2. Knowing high-energy particles and how they are formed.<br>3. Presentation of carbohydrate products and the pathways through which glucose enters.<br>4. Deduce the causes of diabetes and the role of hormones in it. |          |  |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   | <p>5. Discuss fat metabolism, fat oxidation, and the pathways involved in producing energy.</p> <p>6. Showing the construction of some fats within the body of an organism.</p> <p>7. Discuss the metabolism of proteins and the utilization of amino acids in the building process.</p> <p>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>       | <p>29. Metabolism is the result or group of chemical reactions that take place in the cell of an organism. The number of chemical reactions within an organism ranges from hundreds to thousands of reactions. These chemical reactions are responsible for supporting and ensuring the growth of the living organism. These reactions perform their work with a precise system of balancing and checking by the organism's body. These reactions take place according to a path that means production or generation.</p> <p>30. Metabolism was divided into construction or catabolism, meaning that the process of construction is the formation of large molecules from small molecules, while catabolism is the opposite, i.e. the breaking down of molecules.</p> |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                      | <p>7. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</p> <p>8.</p> <p>9. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</p>                                                                                                                                                                                                                                                                                                              |
| <p><b>Learning and Teaching Strategies</b></p> <p>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Strategies</b></p>                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Student Workload (SWL)<br>الحمل الدراسي للطلاب                          |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                    |    |

| Module Evaluation<br>تقييم المادة الدراسية |                 |             |                  |            |                           |
|--------------------------------------------|-----------------|-------------|------------------|------------|---------------------------|
|                                            |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                            | Assignments     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                            | Projects / Lab. | 1           | 10% (10)         | Continuous |                           |
|                                            | Report          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| Summative assessment                       | Midterm Exam    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                            | Final Exam      | 2hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                 |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المناهج الاسبوعي النظري |                                                                                       |
|------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                      |
| Week 1                                                     | Introduction to metabolism, its importance, types, and high-energy molecules.         |
| Week 2                                                     | Carbohydrate metabolism.                                                              |
| Week 3                                                     | The process of glucose dissolution.                                                   |
| Week 4                                                     | Krebs cycle                                                                           |
| Week 5                                                     | Exam                                                                                  |
| Week 6                                                     | The process of generating glucose, the process of breaking down and building glycogen |
| Week 7                                                     | Introduction to fats                                                                  |
| Week 8                                                     | Fat metabolism                                                                        |

|                |                                        |
|----------------|----------------------------------------|
| <b>Week 9</b>  | Beta and alpha oxidation               |
| <b>Week 10</b> | Building phospholipids                 |
| <b>Week 11</b> | First written exam                     |
| <b>Week 12</b> | - Proteins                             |
| <b>Week 13</b> | Metabolism of proteins                 |
| <b>Week 14</b> | Urea cycle                             |
| <b>Week 15</b> | Amino acid metabolism and construction |
| <b>Week 16</b> |                                        |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                                                                                                                     |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                                                                                                                             |
| <b>Week 1</b>                                                                  | introduction to the laboratory glassware and equipment used in experiments.                                                                                                         |
| <b>Week 2</b>                                                                  | Estimating blood sugar in the blood serum.<br>The seventh week: Using anonym to estimate biological components                                                                      |
| <b>Week 3</b>                                                                  | Determination of cholesterol in blood serum.<br>The fourth week: Determination of triglycerides in blood serum.<br>The fifth and sixth weeks: Determination of urea in blood serum. |
| <b>Week 4</b>                                                                  | Determination of triglycerides in blood serum.                                                                                                                                      |
| <b>Week 5</b>                                                                  | Determination of urea in blood serum.                                                                                                                                               |
| <b>Week 6</b>                                                                  | Determination of urea in blood serum.                                                                                                                                               |
| <b>Week 7</b>                                                                  | Exam                                                                                                                                                                                |



## Learning and Teaching Resources

### مصادر التعلم والتدريس

Clinical biochemistry Allan Gaw , Robert A. Cowan Dienic St Michael J . Stewart 2nd edition 1999  
CHURCHILL Livinstone.

Clinical biochemistry A laboratory Perspective Wendy Arneson and Jean Brickell 2007.

المظفر ، سامي . (2001) الكيمياء الحياتية

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                             |                  |             |           |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                           |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information       |                         |  |                                                              |  |  |
|--------------------------|-------------------------|--|--------------------------------------------------------------|--|--|
| معلومات المادة الدراسية  |                         |  |                                                              |  |  |
| Module Title             | Clinical biochemistry-2 |  | Module Delivery                                              |  |  |
| Module Type              | C                       |  | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |  |
| Module Code              |                         |  |                                                              |  |  |
| ECTS Credits             | 3.00                    |  |                                                              |  |  |
| SWL (hr/sem)             | 150                     |  |                                                              |  |  |
| Module Level             |                         |  | Semester of Delivery                                         |  |  |
| Administering Department |                         |  | College                                                      |  |  |

|                                    |                    |                                      |       |
|------------------------------------|--------------------|--------------------------------------|-------|
| <b>Module Leader</b>               | <b>Talat Tariq</b> | <b>e-mail</b>                        |       |
| <b>Module Leader's Acad. Title</b> | Prof.              | <b>Module Leader's Qualification</b> | Ph.D. |
| <b>Module Tutor</b>                |                    | <b>e-mail</b>                        | None  |
| <b>Peer Reviewer Name</b>          |                    | <b>e-mail</b>                        |       |
| <b>Review Committee Approval</b>   |                    | <b>Version Number</b>                | 1.0   |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1. Knowing life energy and how it is liberated and transmitted.<br>2. Knowing high-energy particles and how they are formed.<br>3. Presentation of carbohydrate products and the pathways through which glucose enters.<br>4. Deduce the causes of diabetes and the role of hormones in it.<br>5. Discuss fat metabolism, fat oxidation, and the pathways involved in producing energy.<br>6. Showing the construction of some fats within the body of an organism.<br>7. Discuss the metabolism of proteins and the utilization of amino acids in the building process.<br>. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 31. Metabolism is the result or group of chemical reactions that take place in the cell of an organism. The number of chemical reactions within an organism ranges from hundreds to thousands of reactions. These chemical reactions are responsible for supporting and ensuring the growth of the                                                                                                                                                                                                                                                                                                   |                 |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>living organism. These reactions perform their work with a precise system of balancing and checking by the organism's body. These reactions take place according to a path that means production or generation.</p> <p>32. Metabolism was divided into construction or catabolism, meaning that the process of construction is the formation of large molecules from small molecules, while catabolism is the opposite, i.e. the breaking down of molecules.</p> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <p>10. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</p> <p>11.</p> <p>12. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</p>        |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |         |                |          |                   |
|---------------------------------------------------|---------|----------------|----------|-------------------|
|                                                   | Time/Nu | Weight (Marks) | Week Due | Relevant Learning |

|                      |                 | number |                  |            | Outcome             |
|----------------------|-----------------|--------|------------------|------------|---------------------|
| Formative assessment | Quizzes         | 2      | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11 |
|                      | Assignments     | 2      | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7  |
|                      | Projects / Lab. | 1      | 10% (10)         | Continuous |                     |
|                      | Report          | 1      | 10% (10)         | 13         | LO # 5, 8 and 10    |
| Summative assessment | Midterm Exam    | 2 hr   | 10% (10)         | 7          | LO # 1-7            |
|                      | Final Exam      | 2hr    | 50% (50)         | 16         | All                 |
| Total assessment     |                 |        | 100% (100 Marks) |            |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|         | Material Covered                                                                  |
|---------|-----------------------------------------------------------------------------------|
| Week 1  | Nucleotide metabolism, ribonucleotide biosynthesis, catabolic and final catabolic |
| Week 2  | synthesis of purines,                                                             |
| Week 3  | final catabolism of pyrimidines.                                                  |
| Week 4  | Replication, reproduction                                                         |
| Week 5  | Exam                                                                              |
| Week 6  | translation of genetic information                                                |
| Week 7  | Digestion, absorption.                                                            |
| Week 8  | regulation of vital functions                                                     |
| Week 9  | Liver functions                                                                   |
| Week 10 | Blood composition                                                                 |
| Week 11 | Blood functions                                                                   |
| Week 12 | - Proteins                                                                        |
| Week 13 | Metabolism of proteins                                                            |
| Week 14 | Amino acid metabolism and construction                                            |
| Week 15 | Second Exam                                                                       |
| Week 16 |                                                                                   |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered                                                                                      |
|--------|-------------------------------------------------------------------------------------------------------|
| Week 1 | introduction to the laboratory glassware and equipment used in experiments.                           |
| Week 2 | Determination of alkaline phosphatase enzyme.                                                         |
| Week 3 | determination of the enzyme acid phosphatase.<br>Estimation of biological components in unknown serum |
| Week 4 | Determination of bilirubin in blood serum.                                                            |
| Week 5 | Determination of uric acid in blood serum.                                                            |
| Week 6 | Determination of iron in blood serum.                                                                 |
| Week 7 | Exam                                                                                                  |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

-1 Clinical biochemistry Allan Gaw , Robert A. Cowan Dienic St Michael J . Stewart 2nd edition 1999  
CHURCHILL Livinstone.

Clinical biochemistry A laboratory Perspective Wendy Arneson and Jean Brickell 2007.

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |               |         |           |                                |
|--------------------------------|---------------|---------|-----------|--------------------------------|
| Group                          | Grade         | التقدير | Marks (%) | Definition                     |
| Success Group<br>(50 - 100)    | A - Excellent | امتياز  | 90 - 100  | Outstanding Performance        |
|                                | B - Very Good | جيد جدا | 80 - 89   | Above average with some errors |
|                                | C - Good      | جيد     | 70 - 79   | Sound work with notable errors |

|                        |                  |             |         |                                       |
|------------------------|------------------|-------------|---------|---------------------------------------|
|                        | D - Satisfactory | متوسط       | 60 - 69 | Fair but with major shortcomings      |
|                        | E - Sufficient   | مقبول       | 50 - 59 | Work meets minimum criteria           |
| Fail Group<br>(0 – 49) | FX – Fail        | مقبول بقرار | (45-49) | More work required but credit awarded |
|                        | F – Fail         | راسب        | (0-44)  | Considerable amount of work required  |
|                        |                  |             |         |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                    |                                                                                       |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | Ministry of Higher Education and<br>Scientific Research - Iraq<br>University of Babylon<br>College of Science for women<br>Department of Chemistry |  |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                         |                               |                                                              |
|-----------------------------|-------------------------|-------------------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية     |                         |                               |                                                              |
| Module Title                | Instrumental chemistry2 |                               | Module Delivery                                              |
| Module Type                 | C                       |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code                 |                         |                               |                                                              |
| ECTS Credits                | 3.00                    |                               |                                                              |
| SWL (hr/sem)                | 150                     |                               |                                                              |
| Module Level                |                         | Semester of Delivery          |                                                              |
| Administering Department    |                         | College                       |                                                              |
| Module Leader               | Aseal Mushtaq           | e-mail                        |                                                              |
| Module Leader's Acad. Title | Assist.Prof.            | Module Leader's Qualification | Ph.D.                                                        |
| Module Tutor                |                         | e-mail                        | None                                                         |
| Peer Reviewer Name          |                         | e-mail                        |                                                              |
| Review Committee Approval   |                         | Version Number                | 1.0                                                          |

| Relation with Other Modules                              |                                                                                                                                                                                                                                            |          |  |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                                                                                                                                                            |          |  |
| Prerequisite module                                      | None                                                                                                                                                                                                                                       | Semester |  |
| Co-requisites module                                     | None                                                                                                                                                                                                                                       | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                            |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                            |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | <p>The course aims to:</p> <p>The tremendous development in modern analysis techniques has led to a major qualitative change in the tasks of the chemical analyst.</p> <p>The accuracy, speed, and reliability of the new devices made</p> |          |  |



|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | <p>chemistry break into many fields that were previously impossible. The mission of the current course is to introduce the student to the most important recent developments in the field of chemical analysis and to provide him with the necessary practical experience in using various techniques to make him a pioneering element in the process of solid scientific construction of the country.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p> | <p>33. The course objective is to introduce the students to modern instrumental techniques and analytical approaches within Chemical analysis, environmental and soil chemistry, food chemistry and plant biology.</p> <p>34. After completing the course the student should be able to:</p> <p>35. Knowledge:</p> <p>36. Describe the theory of sampling, sample preparation and sample preparation techniques.</p> <p>37. Refer to the chemical theory behind the use of modern instrumental techniques for quantitative chemical analysis.</p> <p>38. Describe how to identify unknown compounds by spectroscopy and mass spectrometry and to measure their concentration in environmental and food samples.</p> <p>39. Skills:</p> <p>40. Develop and apply methods for separating chemical compounds in mixtures using chromatography.</p> <p>41. Perform quantitative chemical analysis of organic compounds and metals.</p> <p>42. Apply solid data processing and evaluation of analytical data.</p> <p>43. Competences:</p> <p>44. Develop, validate and apply analytical methods in different field of research</p> <p>45. Evaluate and discuss analytical chemical data from the literature.</p> <p>46. Do problem solving in analytical chemistry.</p> |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | .                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <p>13. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</p> <p>14.</p> <p>15. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</p> |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                            |    |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                            |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                        |             |                |            |                           |
|---------------------------------------------------|------------------------|-------------|----------------|------------|---------------------------|
|                                                   |                        | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>         | 2           | 10% (10)       | 5, 10      | LO #1, 2, 10 and 11       |
|                                                   | <b>Assignments</b>     | 2           | 10% (10)       | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                   | <b>Projects / Lab.</b> | 1           | 10% (10)       | Continuous |                           |
|                                                   | <b>Report</b>          | 1           | 10% (10)       | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>    | 2 hr        | 10% (10)       | 7          | LO # 1-7                  |
|                                                   | <b>Final Exam</b>      | 2hr         | 50% (50)       | 16         | All                       |

|                         |                  |  |  |
|-------------------------|------------------|--|--|
| <b>Total assessment</b> | 100% (100 Marks) |  |  |
|-------------------------|------------------|--|--|

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                          |
|--------------------------------------------------------------------------|------------------------------------------|
|                                                                          | <b>Material Covered</b>                  |
| <b>Week 1</b>                                                            | - Introduction to the polymers<br>-      |
| <b>Week 2</b>                                                            | Naming the polymers                      |
| <b>Week 3</b>                                                            | - Preparation of polymers<br>Synthesis   |
| <b>Week 4</b>                                                            | -Polymerization conditions               |
| <b>Week 5</b>                                                            | - Polymer reactions                      |
| <b>Week 6</b>                                                            | - Diagnosis of polymers<br>-             |
| <b>Week 7</b>                                                            | First exam                               |
| <b>Week 8</b>                                                            | Physical properties of polymers          |
| <b>Week 9</b>                                                            | - The most important industrial polymers |
| <b>Week 10</b>                                                           | <b>Modification of natural polymers</b>  |
| <b>Week 11</b>                                                           | <b>Monomers and repeat units</b>         |
| <b>Week 12</b>                                                           | The microstructure of a polymer          |
| <b>Week 13</b>                                                           | <b>Monomer arrangement in copolymers</b> |
| <b>Week 14</b>                                                           | Polymer morphology                       |
| <b>Week 15</b>                                                           | Second exam                              |
|                                                                          |                                          |
|                                                                          |                                          |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |
|--------------------------------------------------------------------------------|
|--------------------------------------------------------------------------------|

|        | Material Covered                                               |
|--------|----------------------------------------------------------------|
| Week 1 | laboratory instructions                                        |
| Week 2 | Preparation of the Rayon's                                     |
| Week 3 | Polymerization of acrylonitrile                                |
| Week 4 | Preparation of nitrocellulose                                  |
| Week 5 | Preparation of phenol formaldehyde                             |
| Week 6 | Preparation of urea formaldehyde<br>Urea acetaldehyde reaction |
| Week 7 | Exam                                                           |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

1- 1989 . كيمياء الجزيئات الكبيرة / د. ذنون محمد بيربادي و د. كوركيس عبد آل آدم (الطبعة الثانية)

2- 1986 . الكيمياء الصناعية / د. كوركيس عبد آل آدم (الطبعة الأولى)

3- كيمياء الجزيئات الكبيرة العملي / د. ذنون محمد بيربادي 1989 .

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

### APPENDIX:

#### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير | Marks (%) | Definition                       |
|-----------------------------|------------------|---------|-----------|----------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز  | 90 - 100  | Outstanding Performance          |
|                             | B - Very Good    | جيد جدا | 80 - 89   | Above average with some errors   |
|                             | C - Good         | جيد     | 70 - 79   | Sound work with notable errors   |
|                             | D - Satisfactory | متوسط   | 60 - 69   | Fair but with major shortcomings |
|                             | E - Sufficient   | مقبول   | 50 - 59   | Work meets minimum criteria      |

|                                |                  |                    |                |                                       |
|--------------------------------|------------------|--------------------|----------------|---------------------------------------|
| <b>Fail Group<br/>(0 – 49)</b> | <b>FX – Fail</b> | <b>مقبول بقرار</b> | <b>(45-49)</b> | More work required but credit awarded |
|                                | <b>F – Fail</b>  | <b>راسب</b>        | <b>(0-44)</b>  | Considerable amount of work required  |
|                                |                  |                    |                |                                       |

**Note:**

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54). The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                             |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Biology</p> |  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

| Module Information          |                        |              |                                                              |      |
|-----------------------------|------------------------|--------------|--------------------------------------------------------------|------|
| معلومات المادة الدراسية     |                        |              |                                                              |      |
| Module Title                | Industrial Chemistry-1 |              | Module Delivery                                              |      |
| Module Type                 | B                      |              | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |      |
| Module Code                 |                        |              |                                                              |      |
| ECTS Credits                | 2.00                   |              |                                                              |      |
| SWL (hr/sem)                | 150                    |              |                                                              |      |
| Module Level                |                        |              | Semester of Delivery                                         |      |
| Administering Department    |                        |              | College                                                      |      |
| Module Leader               | Ahmed Hassan           |              | e-mail                                                       |      |
| Module Leader's Acad. Title |                        | Assist.Prof. | Module Leader's Qualification                                |      |
|                             |                        |              | Ph.D                                                         |      |
| Module Tutor                |                        |              | e-mail                                                       | None |
| Peer Reviewer Name          |                        |              | e-mail                                                       |      |
| Review Committee Approval   |                        |              | Version Number                                               | 1.0  |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                           |          |  |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                                                                      | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                                                                      | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                           |          |  |
| Module Aims<br>أهداف المادة الدراسية                                                                               | <p>The course aims to:</p> <ul style="list-style-type: none"> <li>- A general idea about polymers and their natural and industrial sources.</li> <li>2- Types of polymers.</li> <li>3- Names of some commercial and scientific polymers.</li> <li>4- General methods for preparing polymers.</li> <li>5- The most important polymer reactions.</li> </ul> |          |  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | 6- Find the molecular weight of polymers.<br>7- Methods of diagnosing polymers.<br>8- The most important polymers found in our daily lives.<br>9- Knowledge of the nature of oil, its filtering and processing.<br>10- Evaluation of oil and its derivatives                                                                                                                                                                                                                                                                                    |
| <b>Module Learning Outcomes</b><br><br>مخرجات التعلم للمادة الدراسية   | 47. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.<br>48.<br>49. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..<br>50. Enabling students to discuss and explain the importance of the environment in their lives. |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 16. The course aims for the department's students to acquire information and skills that will make them able to understand industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories.                                                                                                                                                                                                                                 |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                              |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                      |
| <b>Week 1</b>                                                            | Oil, its chemical composition and evaluation                                 |
| <b>Week 2</b>                                                            | Petroleum filtration                                                         |
| <b>Week 3</b>                                                            | Chemical processes in filtration                                             |
| <b>Week 4</b>                                                            | First month exam                                                             |
| <b>Week 5</b>                                                            | Petroleum products                                                           |
| <b>Week 6</b>                                                            | Petrochemical industries                                                     |
| <b>Week 7</b>                                                            | Thermal solution of the formation of alkenes, alkynes, and their derivatives |
| <b>Week 8</b>                                                            | Oil, its chemical composition and evaluation                                 |
| <b>Week 9</b>                                                            | Petroleum filtration                                                         |
| <b>Week 10</b>                                                           | Chemical processes in filtration                                             |
| <b>Week 11</b>                                                           | First month exam                                                             |



|                |                                                                              |
|----------------|------------------------------------------------------------------------------|
| <b>Week 12</b> | Petroleum products                                                           |
| <b>Week 13</b> | Petrochemical industries                                                     |
| <b>Week 14</b> | Thermal solution of the formation of alkenes, alkynes, and their derivatives |
| <b>Week 15</b> | Oil, its chemical composition and evaluation                                 |
| <b>Week 16</b> |                                                                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                           |
|--------------------------------------------------------------------------------|---------------------------|
|                                                                                | <b>Material Covered</b>   |
| <b>Week 1</b>                                                                  | لايوجد عملي في هذه المادة |
| <b>Week 2</b>                                                                  |                           |
| <b>Week 3</b>                                                                  |                           |
| <b>Week 4</b>                                                                  |                           |
| <b>Week 5</b>                                                                  |                           |
| <b>Week 6</b>                                                                  |                           |
| <b>Week 7</b>                                                                  |                           |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b><br><b>مصادر التعلم والتدريس 1- الكيمياء الصناعية د. كوركيس عبد ال ادم 1992 .</b><br><b>2-Cary coyne(1997) . chemistry and the chemical</b><br><b>3-Frank,M.dunnivat.(2004).Enviromental laboratory excexcises for industriment analysis and environmental chemistry.</b><br><b>4-Harold .F.W.Taylor.(1990).cement chemistry.</b> |             |                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Text</b> | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                                                                                                                                                                                                                                                                                                                                                   |             | yes                              |
| <b>Recommended Texts</b>                                                                                                                                                                                                                                                                                                                                                                                |             | No                               |

|          |  |
|----------|--|
| Websites |  |
|----------|--|

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Chemistry



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                    |                               |                                                              |  |
|-----------------------------|--------------------|-------------------------------|--------------------------------------------------------------|--|
| معلومات المادة الدراسية     |                    |                               |                                                              |  |
| Module Title                | English Language-3 |                               | Module Delivery                                              |  |
| Module Type                 | S                  |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |
| Module Code                 |                    |                               |                                                              |  |
| ECTS Credits                | 2.00               |                               |                                                              |  |
| SWL (hr/sem)                | 150                |                               |                                                              |  |
| Module Level                |                    | Semester of Delivery          |                                                              |  |
| Administering Department    |                    | College                       |                                                              |  |
| Module Leader               | Ahmed Rodan        |                               | e-mail                                                       |  |
| Module Leader's Acad. Title | Assist. Prof.      | Module Leader's Qualification | Ph.D                                                         |  |
| Module Tutor                |                    | e-mail                        | None                                                         |  |
| Peer Reviewer Name          |                    | e-mail                        |                                                              |  |
| Review Committee Approval   |                    | Version Number                | 1.0                                                          |  |

### Relation with Other Modules

العلاقة مع المواد الدراسية الأخرى

|                                                                                                                           |                                                                                                                                                                                                                                                                                                                                              |          |  |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                       | None                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| Co-requisites module                                                                                                      | None                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Explaining the material in a clear and understandable way for all students.<br>2. Involve students in discussing and solving exercises.<br>3- Explaining the study material using various methods<br>An explanation to develop students' abilities and break boredom in the classroom                              |          |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 51.The student’s understanding of the material<br>52.The ability to analyze and apply what you have learned practically on the English<br>53.The evaluation should be done by presenting the material to the students in the laboratory and then applying it                                                                                 |          |  |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | 17.The theoretical method and explanation is by presenting the material on the Point Power program in the form of diagrams and pictures<br>18.This is to attract the student's attention and help him not feel bored. The practical method is to apply what has been presented<br>19.On the calculator and conduct daily and monthly exams.. |          |  |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم                                                    |                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Strategies</b>                                                                                                         |                                                                                                                                                                                                                                                                                                                                              |          |  |

|                                                                                 |    |                                                                            |    |
|---------------------------------------------------------------------------------|----|----------------------------------------------------------------------------|----|
| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>                    |    |                                                                            |    |
| <b>Structured SWL (h/sem)</b><br><b>الحمل الدراسي المنتظم للطالب خلال الفصل</b> | 64 | <b>Structured SWL (h/w)</b><br><b>الحمل الدراسي المنتظم للطالب أسبوعيا</b> | 64 |

|                                                                         |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                    |    |

| Module Evaluation<br>تقييم المادة الدراسية |                 |             |                  |            |                           |
|--------------------------------------------|-----------------|-------------|------------------|------------|---------------------------|
|                                            |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                            | Assignments     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                            | Projects / Lab. | 1           | 10% (10)         | Continuous |                           |
|                                            | Report          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| Summative assessment                       | Midterm Exam    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                            | Final Exam      | 2hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                 |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                                |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                               |
| Week 1                                                     | <ul style="list-style-type: none"> <li>The concept of ecology and its connection with other science</li> </ul> |
| Week 2                                                     | <ul style="list-style-type: none"> <li>Naming tenses, present past and present perfect The first</li> </ul>    |
| Week 3                                                     | <ul style="list-style-type: none"> <li>Present simple tenses and conditions The second</li> </ul>              |
| Week 4                                                     | <ul style="list-style-type: none"> <li>Past tenses Third</li> </ul>                                            |
| Week 5                                                     | <ul style="list-style-type: none"> <li>Advice obligation and permission Fourth</li> </ul>                      |
| Week 6                                                     | <ul style="list-style-type: none"> <li>Future forms</li> </ul>                                                 |
| Week 7                                                     | <ul style="list-style-type: none"> <li>Information questions Sixth</li> </ul>                                  |
| Week 8                                                     | <ul style="list-style-type: none"> <li>Reported swim</li> </ul>                                                |
| Week 9                                                     | <ul style="list-style-type: none"> <li>Passion and fashions</li> </ul>                                         |
| Week 10                                                    | <ul style="list-style-type: none"> <li>First Exam.</li> </ul>                                                  |
| Week 11                                                    | <ul style="list-style-type: none"> <li>Verb patterns ninth</li> </ul>                                          |
| Week 12                                                    | Conditionals                                                                                                   |
| Week 13                                                    | <ul style="list-style-type: none"> <li>Second month exam.</li> </ul>                                           |
| Week 14                                                    | <ul style="list-style-type: none"> <li>Noun phrases</li> </ul>                                                 |

|         |                                      |
|---------|--------------------------------------|
| Week 15 | • Models of probability second tenth |
| Week 16 |                                      |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                            |
|------------------------------------------------------------------|----------------------------|
|                                                                  | Material Covered           |
| Week 1                                                           | لا يوجد عملي في هذه المادة |
| Week 2                                                           |                            |
| Week 3                                                           |                            |
| Week 4                                                           |                            |
| Week 5                                                           |                            |
| Week 6                                                           |                            |
| Week 7                                                           |                            |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس                                                                                                                                                                                                                                                                                                                                          |      |                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
| <p>Stern, H.H. (1992). Issues and options in language teaching (edited posthumously by Patrick Allen &amp; Birgit Harley). Oxford: Oxford University Press. Ur, P. (1996). A Course in Language Teaching. Cambridge: Cambridge University Press. Vermes, A. (2010). Translation in foreign language teaching: A brief overview of pros and cons, Eger, Journal of English Studies, 10, 83-93.</p> |      |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                   | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                                                                                                                                                                                    |      | yes                       |
| Recommended Texts                                                                                                                                                                                                                                                                                                                                                                                 |      | No                        |
| Websites                                                                                                                                                                                                                                                                                                                                                                                          |      |                           |

#### APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات |       |         |           |            |
|--------------------------------|-------|---------|-----------|------------|
| Group                          | Grade | التقدير | Marks (%) | Definition |

|                                     |                         |                    |          |                                       |
|-------------------------------------|-------------------------|--------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A - Excellent</b>    | <b>امتياز</b>      | 90 - 100 | Outstanding Performance               |
|                                     | <b>B - Very Good</b>    | <b>جيد جدا</b>     | 80 - 89  | Above average with some errors        |
|                                     | <b>C - Good</b>         | <b>جيد</b>         | 70 - 79  | Sound work with notable errors        |
|                                     | <b>D - Satisfactory</b> | <b>متوسط</b>       | 60 - 69  | Fair but with major shortcomings      |
|                                     | <b>E - Sufficient</b>   | <b>مقبول</b>       | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 - 49)</b>      | <b>FX – Fail</b>        | <b>مقبول بقرار</b> | (45-49)  | More work required but credit awarded |
|                                     | <b>F – Fail</b>         | <b>راسب</b>        | (0-44)   | Considerable amount of work required  |
|                                     |                         |                    |          |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                     |                                                                                                                                                               |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                                     |                               |                                                              |  |
|-----------------------------|-------------------------------------|-------------------------------|--------------------------------------------------------------|--|
| معلومات المادة الدراسية     |                                     |                               |                                                              |  |
| Module Title                | Identification of organic chemistry |                               | Module Delivery                                              |  |
| Module Type                 | C                                   |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |
| Module Code                 |                                     |                               |                                                              |  |
| ECTS Credits                | 4.00                                |                               |                                                              |  |
| SWL (hr/sem)                | 150                                 |                               |                                                              |  |
| Module Level                |                                     | Semester of Delivery          |                                                              |  |
| Administering Department    |                                     | College                       |                                                              |  |
| Module Leader               | Sadiq Abdel hussain                 |                               | e-mail                                                       |  |
| Module Leader's Acad. Title | Prof.                               | Module Leader's Qualification | Ph.D.                                                        |  |
| Module Tutor                |                                     | e-mail                        | None                                                         |  |
| Peer Reviewer Name          |                                     | e-mail                        |                                                              |  |
| Review Committee Approval   |                                     | Version Number                | 1.0                                                          |  |

| Relation with Other Modules                              |                                                                                           |          |  |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                           |          |  |
| Prerequisite module                                      | None                                                                                      | Semester |  |
| Co-requisites module                                     | None                                                                                      | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                           |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                           |          |  |
| Module Aims<br>أهداف المادة الدراسية                     | The course aims to:<br>1- Know the terms of ultraviolet rays and an introduction to these |          |  |



|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>rays.</p> <p>2- Study the effect of these rays on some organic compounds.</p> <p>3- Find the wavelength of dienes.</p> <p>4- Find the wavelength and molar absorption coefficient of purines.</p> <p>5- Find the wavelength of enolates.</p> <p>6- Know the terminology of infrared rays and an introduction to these rays.</p> <p>7- Study the effect of these rays on some organic compounds.</p> <p>8- Study the spectra of alkanes.</p> <p>9- Study the spectra of alkenes.</p> <p>.</p> |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية       | <p>54.Organic diagnosis is considered a complement to the organic chemistry course of the previous stages, studying the interaction of light with organic matter from ultraviolet and visible spectra, infrared spectra, nuclear magnetic resonance spectra, and mass spectra, and knowing these effects.</p>                                                                                                                                                                                   |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | <p>20.Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</p> <p>21.</p> <p>22.Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</p>                                      |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                    |    |                                                                     |    |
|--------------------------------------------------------------------------|----|---------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل | 64 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا | 64 |

|                                                                         |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                    |    |

## Module Evaluation

### تقييم المادة الدراسية

|                      |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|------------|---------------------------|
| Formative assessment | Quizzes         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                      | Assignments     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                      | Projects / Lab. | 1           | 10% (10)         | Continuous |                           |
|                      | Report          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| Summative assessment | Midterm Exam    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                      | Final Exam      | 2hr         | 50% (50)         | 16         | All                       |
| Total assessment     |                 |             | 100% (100 Marks) |            |                           |

## Delivery Plan (Weekly Syllabus)

### المنهاج الأسبوعي النظري

|         | Material Covered                                                                                                                                                                              |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | <ul style="list-style-type: none"> <li>Present the syllabus of the current semester.</li> <li>Infrared Spectroscopy: Introduction, Theory, Instrumentation, and Sample Preparation</li> </ul> |
| Week 2  | <ul style="list-style-type: none"> <li>Infrared Spectroscopy: C,H,O-Containing Functional Groups.</li> </ul>                                                                                  |
| Week 3  | <ul style="list-style-type: none"> <li>Effect of Ring Size Conjugation Electron-Withdrawing Groups.</li> </ul>                                                                                |
| Week 4  | <ul style="list-style-type: none"> <li>Mass Spectrometry: Theory, Instrumentation, and Techniques</li> </ul>                                                                                  |
| Week 5  | <ul style="list-style-type: none"> <li>Isotopic Masses, Isotopic Abundances, and High-Resolution Mass Spectrometry</li> </ul>                                                                 |
| Week 6  | <ul style="list-style-type: none"> <li>Fragmentation in EIMS: Alkanes, Alkenes, Heteroatom Compounds, Carbonyl Compounds.</li> </ul>                                                          |
| Week 7  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                                                                 |
| Week 8  | <ul style="list-style-type: none"> <li>Introduction to NMR Spectroscopy: Concepts and Theory, Part 1</li> </ul>                                                                               |
| Week 9  | <ul style="list-style-type: none"> <li>Introduction to NMR Spectroscopy: Concepts and Theory, Part 2</li> </ul>                                                                               |
| Week 10 | <ul style="list-style-type: none"> <li>Chemical Shift. <sup>1</sup>H NMR Chemical Shifts.</li> </ul>                                                                                          |
| Week 11 | <ul style="list-style-type: none"> <li>Chemical Equivalence and Spin-Spin Coupling.</li> </ul>                                                                                                |
| Week 12 | <ul style="list-style-type: none"> <li>UV-Vis. : Introduction, Theory, Instrumentation, and Sample Preparation</li> </ul>                                                                     |
| Week 13 | <ul style="list-style-type: none"> <li>Valence electrons, types of transition, examples of UV-Vis.</li> </ul>                                                                                 |

|         |                             |
|---------|-----------------------------|
| Week 14 | • Second Exam.              |
| Week 15 | • Discussion the home work. |
| Week 16 |                             |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                                                                              |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                | Material Covered                                                                                                                             |
| Week 1                                                                         | - The students are given chemical materials for the purpose of diagnosing them and knowing their composition, one substance every two weeks. |
| Week 2                                                                         | - Practical, oral and theoretical tests on completed experiments                                                                             |
| Week 3                                                                         |                                                                                                                                              |
| Week 4                                                                         |                                                                                                                                              |
| Week 5                                                                         |                                                                                                                                              |
| Week 6                                                                         |                                                                                                                                              |
| Week 7                                                                         | Exam                                                                                                                                         |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|
| 1. . التشخيص الطيفي للمركبات العضوية (ج1، ج2) / روبرت ام . سليفراينشتاين وآخرون / ترجمة د. هادي كاظم عوض ،آخرون<br>2. أطياف امتصاص الجزيئات العضوية / في . أم . بارخ / ترجمة د. عبد الحسين خضير شربة و آخرون<br>3. . التحليل الطيفي للمركبات العضوية / مالكوم أم. كامبل / ترجمة د. سهيلة طالب حمدي<br>4. . التشخيص النظامي للمركبات العضوية / د . جورج يوناتان سركيس وآخرون<br><br>5- P.Crews, J.rodriquez , M.jaspars;Organic structure analysis (1998).<br>6- (R.Mannhold,H.kubinyi&G.Folkers ; BioNMR in durg research(2000 |      |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Text | Available in the Library? |
| Required Texts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | yes                       |
| Recommended Texts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      | No                        |
| Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                           |

## APPENDIX:

| GRADING SCHEME                                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                         |                  |             |           |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Chemistry



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                     |                               |                                                              |  |
|-----------------------------|---------------------|-------------------------------|--------------------------------------------------------------|--|
| معلومات المادة الدراسية     |                     |                               |                                                              |  |
| Module Title                | Heterocyclic        |                               | Module Delivery                                              |  |
| Module Type                 | B                   |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |
| Module Code                 |                     |                               |                                                              |  |
| ECTS Credits                | 2.00                |                               |                                                              |  |
| SWL (hr/sem)                | 150                 |                               |                                                              |  |
| Module Level                |                     | Semester of Delivery          |                                                              |  |
| Administering Department    |                     | College                       |                                                              |  |
| Module Leader               | Sadiq Abdol Hussain |                               | e-mail                                                       |  |
| Module Leader's Acad. Title | Prof.               | Module Leader's Qualification | Ph.D                                                         |  |
| Module Tutor                |                     | e-mail                        | None                                                         |  |
| Peer Reviewer Name          |                     | e-mail                        |                                                              |  |
| Review Committee Approval   |                     | Version Number                | 1.0                                                          |  |

### Relation with Other Modules

العلاقة مع المواد الدراسية الأخرى

|                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                       | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| Co-requisites module                                                                                                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Semester |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | 1- Studying the heterocyclic compounds<br>2- Studying the polycyclic organic compounds<br>3- Studying the polycyclic organic atoms<br><br>4- Studying the biological application.                                                                                                                                                                                                                                                                                                                                                            |          |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 55.Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.<br>56.<br>57.Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..<br>58.Enabling students to discuss and explain the importance of the environment in their lives. |          |  |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | 23.The course aims for the department’s students to acquire information and skills that will make them able to understand heterocyclic compounds and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories.                                                                                                                                                                                                                             |          |  |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |
| <b>Strategies</b>                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |  |

### Student Workload (SWL)

| الحمل الدراسي للطالب                                                    |     |                                                                    |    |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                    |    |

| Module Evaluation<br>تقييم المادة الدراسية |                 |             |                  |            |                           |
|--------------------------------------------|-----------------|-------------|------------------|------------|---------------------------|
|                                            |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                            | Assignments     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                            | Projects / Lab. | 1           | 10% (10)         | Continuous |                           |
|                                            | Report          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| Summative assessment                       | Midterm Exam    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                            | Final Exam      | 2hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                 |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                                                                         |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                                                        |
| Week 1                                                     | <ul style="list-style-type: none"> <li>Present the syllabus of the current semester.</li> <li>Introduction of the cyclic and the Aromaticity</li> </ul> |
| Week 2                                                     | <ul style="list-style-type: none"> <li>Oxiranes</li> </ul>                                                                                              |
| Week 3                                                     | <ul style="list-style-type: none"> <li>Oxaziridines</li> </ul>                                                                                          |
| Week 4                                                     | <ul style="list-style-type: none"> <li>Aziridine</li> </ul>                                                                                             |
| Week 5                                                     | <ul style="list-style-type: none"> <li>THIETANES</li> </ul>                                                                                             |
| Week 6                                                     | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                                                           |
| Week 7                                                     | <ul style="list-style-type: none"> <li>Five-member ring heterocyclic</li> </ul>                                                                         |
| Week 8                                                     | <ul style="list-style-type: none"> <li>1,2-Azole</li> </ul>                                                                                             |
| Week 9                                                     | <ul style="list-style-type: none"> <li>1,3-Azole</li> </ul>                                                                                             |

|                |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>1,2,3-Triazoles</li> </ul>           |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>1,2,4-Triazoles</li> </ul>           |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>Pyrylium Ion</li> </ul>              |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>Pyridine</li> </ul>                  |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>              |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>Discussion the home work.</li> </ul> |
| <b>Week 16</b> |                                                                             |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                            |
|--------------------------------------------------------------------------------|----------------------------|
|                                                                                | <b>Material Covered</b>    |
| <b>Week 1</b>                                                                  | لا يوجد عملي في هذه المادة |
| <b>Week 2</b>                                                                  |                            |
| <b>Week 3</b>                                                                  |                            |
| <b>Week 4</b>                                                                  |                            |
| <b>Week 5</b>                                                                  |                            |
| <b>Week 6</b>                                                                  |                            |
| <b>Week 7</b>                                                                  |                            |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b>                                                                                                                                                                                                                                                                                                             |             |                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------|
| <p>“Heterocyclic Chemistry” by Raj K. Bansal 5th Edn, New Age International Publisher, ISBN 978-81-224-3143-8. 7. “Heterocyclic Chemistry” 5th Edn. by J. A. Joule, K. Mills and G. F. Smith, Wiley International Publications, ISBN: 978-1-4051-3300-5. 8. “Heterocyclic Chemistry” (3rd Edition) by Thomas. L. Gilchrist, Prentice Hall Publication, ISBN 978-0-5822-7843-1.</p> |             |                                  |
|                                                                                                                                                                                                                                                                                                                                                                                    | <b>Text</b> | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                                                                                                                                                                                                                                                                                                                              |             | yes                              |
| <b>Recommended Texts</b>                                                                                                                                                                                                                                                                                                                                                           |             | No                               |
| <b>Websites</b>                                                                                                                                                                                                                                                                                                                                                                    |             |                                  |



## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Babylon  
College of Science for women  
Department of Chemistry



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information          |                |                               |                                                              |  |
|-----------------------------|----------------|-------------------------------|--------------------------------------------------------------|--|
| معلومات المادة الدراسية     |                |                               |                                                              |  |
| Module Title                | Photochemistry |                               | Module Delivery                                              |  |
| Module Type                 | B              |                               | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |  |
| Module Code                 |                |                               |                                                              |  |
| ECTS Credits                | 2.00           |                               |                                                              |  |
| SWL (hr/sem)                | 150            |                               |                                                              |  |
| Module Level                |                | Semester of Delivery          |                                                              |  |
| Administering Department    |                | College                       |                                                              |  |
| Module Leader               | Hazim Yahya    |                               | e-mail                                                       |  |
| Module Leader's Acad. Title | Prof.          | Module Leader's Qualification | Ph.D                                                         |  |
| Module Tutor                |                | e-mail                        | None                                                         |  |
| Peer Reviewer Name          |                | e-mail                        |                                                              |  |
| Review Committee Approval   |                | Version Number                | 1.0                                                          |  |

### Relation with Other Modules

العلاقة مع المواد الدراسية الأخرى

|                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |  |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                       | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |  |
| <b>Module Aims</b><br><b>أهداف المادة الدراسية</b>                                                                               | <p>The course aims to:</p> <ol style="list-style-type: none"> <li>1- Studying the first laws of photochemistry, Grothus Draper, and the second law, Stark Einstein, their applications, and chemical equations.</li> <li>2 - Giving mathematical examples of the Beer-Lambert law and explaining them to the students in detail.</li> <li>3 - Interpretation of the regions of the spectrum and Maher's description of the extent of each region.</li> <li>4 - Explaining the laws related to energy calculations and giving illustrative examples.</li> <li>5 - Study of energy curves</li> <li>6 - Calculating the quantity product and giving illustrative examples so that the students can understand the topic.</li> <li>7 - Explaining electronic spectra and Frank-Condens's rule with diagrams for the purpose of facilitating understanding of the topic.</li> <li>8 - Study the Jablonski diagram, drawing the diagram on the board and explaining the transitions.</li> <li>9 - Explain the phenomena of adsorption and absorption, giving examples from reality</li> </ol> |                 |  |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <ol style="list-style-type: none"> <li>59. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.</li> <li>60.</li> <li>61. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</li> <li>62. Enabling students to discuss and explain the importance of the environment in their lives.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |  |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <ol style="list-style-type: none"> <li>24. The course aims for the department's students to acquire information and skills that will make them able to understand</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |  |

|                                                                        |                                                                                                                                                                                      |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | industrial processes and their accompanying chemical and transformational changes to lay the necessary foundation for developing a strategy for building factories and laboratories. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                      |
| Strategies                                                             |                                                                                                                                                                                      |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|---------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                   |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                   | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                   | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                   | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                   | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                           |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |
|-------------------------------------------------------------------|
|-------------------------------------------------------------------|

|         | Material Covered                            |
|---------|---------------------------------------------|
| Week 1  | Introduction to photochemistry              |
| Week 2  | First law of photochemistry                 |
| Week 3  | Second law of photochemistry                |
| Week 4  | Primary and secondary process               |
| Week 5  | Electromagnetic radiation                   |
| Week 6  | Deference between thermal and photo process |
| Week 7  | Beer's law                                  |
| Week 8  | First Exam                                  |
| Week 9  | Optical spectroscopic instruments           |
| Week 10 | Types of monochromators                     |
| Week 11 | Radiation detectors                         |
| Week 12 | Photometers                                 |
| Week 13 | Spectrophotometers                          |
| Week 14 | Problems solution and discussion            |
| Week 15 | Second exam                                 |
| Week 16 |                                             |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                           |
|------------------------------------------------------------------|---------------------------|
|                                                                  | Material Covered          |
| Week 1                                                           | لايوجد عملي في هذه الماده |
| Week 2                                                           |                           |
| Week 3                                                           |                           |
| Week 4                                                           |                           |

|        |  |
|--------|--|
| Week 5 |  |
| Week 6 |  |
| Week 7 |  |

## Learning and Teaching Resources

### مصادر التعلم والتدريس

- 1 - P.W. Atkins, physical chemistry , sixth Ed. ,oxford university press, New Yourk , 2001 , p420 – m421 .
- 2 – J. A. Barltop and J. D . Coyle "principles of photo chemistry " John willy and sons. LTd .New yourk , 1975 , p21 .
- 3 – G.M.Braw , physical chemistry , fourth Ed. ,Mc Graw Hill press, 1982 , pp 762 – 773 .

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                               |                                                                                      |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and<br/>Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                   |                                                   |
|-----------------------------------------------|-------------------|---------------------------------------------------|
| Module Title                                  | Quantum Chemistry | Module Delivery                                   |
| Module Type                                   | C                 | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical |
| Module Code                                   |                   |                                                   |
| ECTS Credits                                  | 2.00              |                                                   |

|                             |                      |                               |       |  |
|-----------------------------|----------------------|-------------------------------|-------|--|
| SWL (hr/sem)                | 150                  | Seminar                       |       |  |
| Module Level                |                      | Semester of Delivery          |       |  |
| Administering Department    |                      | College                       |       |  |
| Module Leader               | Ayad Fahdel Mohammed | e-mail                        |       |  |
| Module Leader's Acad. Title | Prof.                | Module Leader's Qualification | Ph.D. |  |
| Module Tutor                |                      | e-mail                        | None  |  |
| Peer Reviewer Name          |                      | e-mail                        |       |  |
| Review Committee Approval   |                      | Version Number                | 1.0   |  |

| Relation with Other Modules<br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |  |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| Prerequisite module                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Semester |  |
| Co-requisites module                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Semester |  |
| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |  |
| Module Aims<br>أهداف المادة الدراسية                                                                               | <p>The course aims to:</p> <ol style="list-style-type: none"> <li>1- Knowledge of applications of mathematics in physical chemistry.</li> <li>2- Theoretical studies of the quantitative hypothesis.</li> <li>3- Finding a link between inorganic chemistry and quantum theory.</li> <li>4- Interpretation of the phenomena of emission and absorption</li> <li>5- Theoretical studies of energy and motion equations.</li> <li>6- A theoretical study of IR, UV, N.M.R, and E.S.R.</li> </ol> |          |  |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | <p>63. The science of quantum chemistry and spectroscopy is considered a complementary relationship to the subjects of physical and inorganic chemistry, as it deals with mathematical functions and their applications in finding objective solutions to the theoretical hypotheses that were developed to build the atom and the ionic states of atoms and molecules.</p>                                                                                                                    |          |  |



|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | 25. Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.<br>26.<br>27. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis.. |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Strategies</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب                          |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                 |                  |          |                           |                     |
|---------------------------------------------------|-----------------|------------------|----------|---------------------------|---------------------|
|                                                   | Time/Number     | Weight (Marks)   | Week Due | Relevant Learning Outcome |                     |
| Formative assessment                              | Quizzes         | 2                | 10% (10) | 5, 10                     | LO #1, 2, 10 and 11 |
|                                                   | Assignments     | 2                | 10% (10) | 2, 12                     | LO # 3, 4, 6 and 7  |
|                                                   | Projects / Lab. | 1                | 10% (10) | Continuous                |                     |
|                                                   | Report          | 1                | 10% (10) | 13                        | LO # 5, 8 and 10    |
| Summative assessment                              | Midterm Exam    | 2 hr             | 10% (10) | 7                         | LO # 1-7            |
|                                                   | Final Exam      | 2hr              | 50% (50) | 16                        | All                 |
| Total assessment                                  |                 | 100% (100 Marks) |          |                           |                     |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|         | Material Covered                                                                                                          |
|---------|---------------------------------------------------------------------------------------------------------------------------|
| Week 1  | <ul style="list-style-type: none"> <li>Energy Equations</li> </ul>                                                        |
| Week 2  | <ul style="list-style-type: none"> <li>Study the particle function in one-dimensional + three-dimensional box.</li> </ul> |
| Week 3  | <ul style="list-style-type: none"> <li>Study of harmonic vibrator</li> </ul>                                              |
| Week 4  | <ul style="list-style-type: none"> <li>Study of harmonic vibrator</li> </ul>                                              |
| Week 5  | <ul style="list-style-type: none"> <li>Study of hard rotor function.</li> </ul>                                           |
| Week 6  | <ul style="list-style-type: none"> <li>Study of hard rotor function.</li> </ul>                                           |
| Week 7  | <ul style="list-style-type: none"> <li>First exam.</li> </ul>                                                             |
| Week 8  | <ul style="list-style-type: none"> <li>Isothermal and literary processes</li> </ul>                                       |
| Week 9  | <ul style="list-style-type: none"> <li>Isothermal and literary processes</li> </ul>                                       |
| Week 10 | <ul style="list-style-type: none"> <li>Study of hydrogen atom and similar ions</li> </ul>                                 |
| Week 11 | <ul style="list-style-type: none"> <li>Study of hydrogen atom and similar ions</li> </ul>                                 |
| Week 12 | <ul style="list-style-type: none"> <li>Study theories of approximation</li> </ul>                                         |
| Week 13 | <ul style="list-style-type: none"> <li>Study theories of approximation</li> </ul>                                         |
| Week 14 | <ul style="list-style-type: none"> <li>Second Exam.</li> </ul>                                                            |
| Week 15 | <ul style="list-style-type: none"> <li>Discussion the home work.</li> </ul>                                               |
| Week 16 |                                                                                                                           |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered           |
|--------|----------------------------|
| Week 1 | لا يوجد عملي في هذه الماده |
| Week 2 |                            |
| Week 3 |                            |
| Week 4 |                            |
| Week 5 |                            |
| Week 6 |                            |
| Week 7 |                            |

## Learning and Teaching Resources

### مصادر التعلم والتدريس

- Quantum mechanics in chemistry" 3<sup>th</sup> edition by Hanna 1981.
- Introduction to quantum theory and atomic structure by Cox, 1996.
- Physical chemistry 5<sup>th</sup> by Walter J. Moor, 1972.

-

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

### GRADING SCHEME

#### مخطط الدرجات

| Group                       | Grade            | التقدير     | Marks (%) | Definition                            |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                             | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                             | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                             |                  |             |           |                                       |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي

|                                                                                    |                                                                                                                                                           |                                                                                      |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <p>Ministry of Higher Education and Scientific Research - Iraq<br/>University of Babylon<br/>College of Science for women<br/>Department of Chemistry</p> |  |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

| Module Information       |              |  |                      |                                                              |
|--------------------------|--------------|--|----------------------|--------------------------------------------------------------|
| معلومات المادة الدراسية  |              |  |                      |                                                              |
| Module Title             | Spectroscopy |  |                      | Module Delivery                                              |
| Module Type              | C            |  |                      | Theory<br>Lecture<br>Lab<br>Tutorial<br>Practical<br>Seminar |
| Module Code              |              |  |                      |                                                              |
| ECTS Credits             |              |  |                      |                                                              |
| SWL (hr/sem)             |              |  |                      |                                                              |
|                          | 2.00         |  |                      |                                                              |
|                          | 150          |  |                      |                                                              |
| Module Level             |              |  | Semester of Delivery |                                                              |
| Administering Department |              |  | College              |                                                              |

|                                    |                             |                                      |       |
|------------------------------------|-----------------------------|--------------------------------------|-------|
| <b>Module Leader</b>               | <b>Ayad Fahdel Mohammed</b> | <b>e-mail</b>                        |       |
| <b>Module Leader's Acad. Title</b> | Prof.                       | <b>Module Leader's Qualification</b> | Ph.D. |
| <b>Module Tutor</b>                |                             | <b>e-mail</b>                        | None  |
| <b>Peer Reviewer Name</b>          |                             | <b>e-mail</b>                        |       |
| <b>Review Committee Approval</b>   |                             | <b>Version Number</b>                | 1.0   |

| <b>Relation with Other Modules</b><br>العلاقة مع المواد الدراسية الأخرى                                                   |                                                                                                                                                                                                                                                                                                                                                                                                            |                 |  |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| <b>Prerequisite module</b>                                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Semester</b> |  |
| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                            |                 |  |
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | The course aims to:<br>1- Knowledge of applications of mathematics in physical chemistry.<br>2- Theoretical studies of the quantitative hypothesis.<br>3- Finding a link between inorganic chemistry and quantum theory.<br>4- Interpretation of the phenomena of emission and absorption<br>5- Theoretical studies of energy and motion equations.<br>6- A theoretical study of IR, UV, N.M.R, and E.S.R. |                 |  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 64. The science of quantum chemistry and spectroscopy is considered a complementary relationship to the subjects of physical and inorganic chemistry, as it deals with mathematical functions and their applications in finding objective solutions to the theoretical hypotheses that were developed to build the atom and the ionic states of atoms and molecules.                                       |                 |  |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | 28.Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing,                                                                                                                                                                                                                           |                 |  |

|                                                                               |                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | <p>data analysis, quality assurance and method validation.</p> <p>29.</p> <p>30. Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis..</p> |
| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                            |
| <b>Strategies</b>                                                             |                                                                                                                                                                                                                                                                            |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب</b>                   |     |                                                                           |    |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 64 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 68  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 68 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |    |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5, 10      | LO #1, 2, 10 and 11       |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO # 5, 8 and 10          |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>    | 2 hr        | 10% (10)         | 7          | LO # 1-7                  |
|                                                          | <b>Final Exam</b>      | 2hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                         |
|--------------------------------------------------------------------------|-------------------------|
|                                                                          | <b>Material Covered</b> |

|                |                                                                                                                                       |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | <ul style="list-style-type: none"> <li>• Introduction to Spectra</li> </ul>                                                           |
| <b>Week 2</b>  | <ul style="list-style-type: none"> <li>• Introduction to Spectroscopy</li> </ul>                                                      |
| <b>Week 3</b>  | <ul style="list-style-type: none"> <li>• Spectroscopic study of the absorption process.</li> </ul>                                    |
| <b>Week 4</b>  | <ul style="list-style-type: none"> <li>• Spectroscopic study of the emission process.</li> </ul>                                      |
| <b>Week 5</b>  | <ul style="list-style-type: none"> <li>• Spectroscopic study of the absorption and emission process and its applications .</li> </ul> |
| <b>Week 6</b>  | <ul style="list-style-type: none"> <li>• Study the rotational energy of atoms and molecules.</li> </ul>                               |
| <b>Week 7</b>  | <ul style="list-style-type: none"> <li>• First exam.</li> </ul>                                                                       |
| <b>Week 8</b>  | <ul style="list-style-type: none"> <li>• Study of the vibrational energy of atoms</li> </ul>                                          |
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>• Study of the vibrational energy of molecules</li> </ul>                                      |
| <b>Week 10</b> | <ul style="list-style-type: none"> <li>• Study of the rotational and vibrational energy of atoms</li> </ul>                           |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>• Study of the rotational and vibrational energy molecules</li> </ul>                          |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>• Nuclear magnetic resonance study.</li> </ul>                                                 |
| <b>Week 13</b> | <ul style="list-style-type: none"> <li>• 8. Study of Permian electron resonance.</li> </ul>                                           |
| <b>Week 14</b> | <ul style="list-style-type: none"> <li>• Second Exam.</li> </ul>                                                                      |
| <b>Week 15</b> | <ul style="list-style-type: none"> <li>• Discussion the rotational and vibrational energy</li> </ul>                                  |
| <b>Week 16</b> |                                                                                                                                       |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                           |
|--------------------------------------------------------------------------------|---------------------------|
|                                                                                | <b>Material Covered</b>   |
| <b>Week 1</b>                                                                  | لايوجد عملي في هذه المادة |
| <b>Week 2</b>                                                                  |                           |
| <b>Week 3</b>                                                                  |                           |
| <b>Week 4</b>                                                                  |                           |
| <b>Week 5</b>                                                                  |                           |
| <b>Week 6</b>                                                                  |                           |
| <b>Week 7</b>                                                                  |                           |

## Learning and Teaching Resources

## مصادر التعلم والتدريس

1. أطياف امتصاص الجزيئات العضوية / في. أم. بارخ / ترجمة د. عبد الحسين خضير شربة و آخرون
2. التحليل الطيفي للمركبات العضوية / مالكوم أم. كامبل / ترجمة د. سهيلة طالب حمدي
3. التشخيص النظامي للمركبات العضوية / د. جورج يونانسان سركييس وآخرون
- 4- P.Crews, J.rodriquez , M.jaspars;Organic structure analysis (1998).
- 5.(R.Mannhold,H.kubinyi&G.Folkers ; BioNMR in durg research(2000 -

|                   | Text | Available in the Library? |
|-------------------|------|---------------------------|
| Required Texts    |      | yes                       |
| Recommended Texts |      | No                        |
| Websites          |      |                           |

## APPENDIX:

| GRADING SCHEME<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                       |                  |             |           |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير     | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب        | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                      |                  |             |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                |                  |             |           |                                       |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |             |           |                                       |





ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي



**Ministry of Higher Education and Scientific Research**

**Scientific Supervision and Evaluation device**

**Department of Quality Assurance and Academic Accreditation**

**International Accreditation Department**

***Academic Program Description For the  
Department of Chemistry for the Academic year  
2025-2024***



## Academic Program Description Form

**University Name:** University of Babylon

**College/Institute:** College of Science for Women

**Name of the academic or professional program:** Bachelor's in Chemistry

**Name of final degree:** Bachelor's in Chemistry

**Study system:** semester + Bologna track

**Description preparation date:** 20/11/2024

**Date of filling out the file:** 19/2/2025

**Signature:**

**Name of Department Head**

Hazim Yahya Mohammed Ali

**Date:** 6 / 3 / 2025

**Signature:**

**Name of Scientific Assistant**

Dr. Kawthar Mohammed Ali Hassan

**Date:** 6 / 3 / 2025

**The file is checked by**

**Department of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Department:**

Mohammed J.Jader

**Date:** 6 / 3 / 2025

**Signature:**



**Approval of the Dean**

## ***Academic Program Description***

### **1. Program Vision**

Preparing a scientific and technical staff specialized in chemical analysis techniques with the ability to deal with all techniques in chemical analysis with high professionalism, including analyzes concerned with treating pollution from heavy chemical substances and elements such as lead and mercury that affect the lives of citizens. The department also contributes to the scientific research movement and introductory, developmental and advisory conferences. The unified curricula have been adopted with most Iraqi universities - the Department of Chemistry for the purpose of easy movement between departments in addition to scientific benefit from them, taking into account the requirements of the college as a scientific college.

### **2. Program Mission**

The Department of Chemistry at the College of Science for Girls seeks, in integration with the college's mission, to meet the community's needs for cadres specialized in chemistry, such as pathological analyzes and the use of modern techniques in the field of analysis of toxic and non-toxic elements in all scientific and practical applications, especially in the medical and industrial fields, and the preparation of cadres required by this. Specialized research to work in this field and keep up with the latest developments in it.

In order to achieve the vision of the College of Science for Girls and to carry out its pioneering role in assuming a prominent scientific position among local, Arab and foreign colleges, the Department of Chemistry seeks to disseminate and consolidate the latest information about chemistry in Iraqi society to keep pace with the tremendous development that has been achieved during the last three decades in this field and at all levels of Nanotechnology and even outer space.

### **3. Program Objectives**

- .1 Preparing efficient cadres in the field of chemistry sciences
- .2 Contribute to the development of cadres working in the field of chemical sciences in various sectors such as the manufacture of fertilizers, oils and dairy.
- .3 Developing the work system in the field of chemistry
- .4 Spreading scientific awareness in the field of chemistry
5. Calculation of work in the industrial field related to chemistry according to the ISO standard

#### 4. Programmatic Accreditation

nothing

#### 5. Other External Influences

nothing

#### 6. Program Structure

| <i>Program Structure</i> | <i>Number of courses</i>                                    |   | <i>Credit hours</i>                                         |   | <i>Percentage</i> | <i>Reviews</i> |
|--------------------------|-------------------------------------------------------------|---|-------------------------------------------------------------|---|-------------------|----------------|
| Enterprise Requirements  | The first stage,Course (1), according to the Bologna system | 2 | The first stage,Course (1), according to the Bologna system | 4 | %13.3             | Basic          |
|                          | The first stage,Course (2), according to the Bologna system | 2 | The first stage,Course (2), according to the Bologna system | 5 | %16.6             |                |
|                          | Second stage Course (1) according to the Bologna system     | 2 | Second stage Course (1) according to the Bologna system     | 3 | %14.2             |                |
|                          | Second stage Course (2) according to the                    | 2 | Second stage Course (2) according to the Bologna            | 3 | %14.2             |                |

|                         |                                                             |    |                                                             |    |       |       |
|-------------------------|-------------------------------------------------------------|----|-------------------------------------------------------------|----|-------|-------|
|                         | Bologna system                                              |    | system                                                      |    |       |       |
|                         | The third stage Course (1)                                  | -  | The third stage Course (1)                                  | -  | -     |       |
|                         | The third stage Course (2)                                  | 1  | The third stage Course (2)                                  | 2  | %11.1 |       |
|                         | Fourth stage Course (1)                                     | -  | Fourth stage Course (1)                                     | -  | -     |       |
|                         | Fourth stage Course (2)                                     | 1  | Fourth stage Course (2)                                     | 2  | %11.7 |       |
| Total summation         |                                                             | 10 |                                                             | 19 |       |       |
| College Requirements    | The first stage,Course (1), according to the Bologna system | 1  | The first stage,Course (1), according to the Bologna system | 5  | %16.6 | Basic |
|                         | The first stage,Course (2), according to the Bologna system | 1  | The first stage,Course (2), according to the Bologna system | 4  | %13.3 |       |
| Total summation         |                                                             | 2  |                                                             | 9  |       |       |
| Department Requirements | The first stage,Course (1), according to the Bologna system | 3  | The first stage,Course (1), according to the Bologna system | 21 | %70   | Basic |
|                         | The first stage,Course (2), according to the Bologna system | 3  | The first stage,Course (2), according to the Bologna system | 21 | %70   |       |
|                         | Second stage Course (1)                                     | 7  | Second stage Course (1)                                     | 18 | %85.7 |       |

|                 |                            |    |                            |     |       |       |
|-----------------|----------------------------|----|----------------------------|-----|-------|-------|
|                 | Second stage Course (2)    | 7  | Second stage Course (2)    | 18  | %85.7 |       |
|                 | The third stage Course (1) | 7  | The third stage Course (1) | 19  | %100  |       |
|                 | The third stage Course (2) | 6  | The third stage Course (2) | 16  | %88.8 |       |
|                 | Fourth stage Course (1)    | 8  | Fourth stage Course (1)    | 15  | %100  |       |
|                 | Fourth stage Course (2)    | 7  | Fourth stage Course (2)    | 15  | %88.2 |       |
| Total summation |                            | 48 |                            | 143 |       |       |
| Summer Training | 1                          |    | -                          |     |       | Basic |

## 7. Program Description

| Year/level | course code | Name of the course | Credit hours |           |
|------------|-------------|--------------------|--------------|-----------|
|            |             |                    | Theoretical  | Practical |



|  |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                        |                                                                                     |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Republic of Iraq - Ministry of Higher Education and Scientific Research<br>University of Babylon<br>Bachelor's degree in chemistry science (First cycle)<br>Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr<br>Program Curriculum (2024 - 2025) | جمهورية العراق - وزارة التعليم العالي والبحث العلمي<br>جامعة بابل<br>بكالوريوس في علوم الكيمياء (الدورة الأولى)<br>أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة<br>المنهاج الدراسي للعام ٢٠٢٤-٢٠٢٥ |  |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

| Level | Semeste | No.        | Module Code                    | Module Name in English        | اسم المادة الدراسية   | Language | SSWL (hr/w) |            |           |           |            |           |          | Exam<br>hr/se | SSW | USSW | SWL   | ECTS | Modul<br>e Type | Prerequisite<br>Module(s) Code |
|-------|---------|------------|--------------------------------|-------------------------------|-----------------------|----------|-------------|------------|-----------|-----------|------------|-----------|----------|---------------|-----|------|-------|------|-----------------|--------------------------------|
|       |         |            |                                |                               |                       |          | CL (hr/w)   | ect (hr/w) | ab (hr/w) | Pr (hr/w) | Tut (hr/w) | em (hr/w) | n (hr/w) |               | L   | L    |       |      |                 |                                |
| One   | 1       | CHEM1111   | Qualitative Analysis Chemistry | كيمياء التحليل النوعي         | English               | 2        | 0           | 2          | 0         | 0         | 0          | 0         | 3        | 63            | 137 | 200  | 8.00  | C    |                 |                                |
|       | 2       | CHEM1112   | Inorganic1                     | اللاعضوية ١                   | English               | 2        | 0           | 0          | 0         | 0         | 0          | 0         | 3        | 33            | 142 | 175  | 7.00  | C    |                 |                                |
|       | 3       | CHEM1103   | Cytology                       | علم الخلية                    | English               | 2        | 0           | 2          | 0         | 0         | 0          | 0         | 3        | 63            | 87  | 150  | 6.00  | S    |                 |                                |
|       | 4       | CHEM1104   | Labortary Safty                | السلامة والأمن الكيميائي      | English               | 2        | 0           | 0          | 0         | 0         | 0          | 0         | 3        | 33            | 92  | 125  | 5.00  | S    |                 |                                |
|       | 5       | UOBAB1104  | Human and Democracy            | حقوق الإنسان والديمقراطية     | Arabic                | 2        | 0           | 0          | 0         | 0         | 0          | 0         | 3        | 33            | 17  | 50   | 2.00  | B    |                 |                                |
|       | 6       | UOBAB1102  | Arabic Language                | اللغة العربية                 | Arabic                | 2        | 0           | 0          | 0         | 0         | 0          | 0         | 3        | 33            | 17  | 50   | 2.00  | B    |                 |                                |
|       | Total   |            |                                |                               |                       |          | 12          | 0          | 4         | 0         | 0          | 0         | 18       | 258           | 492 | 750  | 30.00 |      |                 |                                |
| UGI   |         |            |                                |                               |                       |          | SSWL (hr/w) |            |           |           |            |           |          | Exam<br>hr/se | SSW | USSW | SWL   | ECTS | Modul<br>e Type | Prerequisite<br>Module(s) Code |
|       | Semeste | No.        | Module Code                    | Module Name in English        | اسم المادة الدراسية   | Language | CL (hr/w)   | ect (hr/w) | ab (hr/w) | Pr (hr/w) | Tut (hr/w) | em (hr/w) | n (hr/w) |               | L   | L    |       |      |                 |                                |
|       | Two     | 1          | CHEM1201                       | Volumetric Analysis Chemistry | كيمياء التحليل الحجمي | English  | 2           | 0          | 2         | 0         | 0          | 0         | 0        | 3             | 63  | 137  | 200   | 8.00 | C               | CHEM1111                       |
|       |         | 2          | CHEM1202                       | Inorganic 2                   | اللاعضوية ٢           | English  | 2           | 0          | 0         | 0         | 0          | 0         | 0        | 3             | 33  | 142  | 175   | 7.00 | C               | CHEM1112                       |
|       |         | 3          | CHEM1203                       | Mathematics I                 | رياضيات I             | English  | 2           | 0          | 0         | 0         | 0          | 0         | 0        | 3             | 33  | 67   | 100   | 4.00 | S               |                                |
|       |         | 4          | CHEM1204                       | Physics Science               | الفيزياء              | English  | 2           | 0          | 2         | 0         | 0          | 0         | 0        | 3             | 63  | 87   | 150   | 6.00 | S               |                                |
|       |         | 5          | UOBABb4                        | Computer I                    | حاسوب I               | Arabic   | 2           | 0          | 0         | 0         | 0          | 0         | 0        | 3             | 33  | 42   | 75    | 3.00 | B               |                                |
| 6     |         | UOBABb1101 | English Language I             | لغة الانجليزية I              | English               | 2        | 0           | 0          | 0         | 0         | 0          | 0         | 3        | 33            | 17  | 50   | 2.00  | B    |                 |                                |
| Total |         |            |                                |                               |                       | 12       | 0           | 4          | 0         | 0         | 0          | 0         | 18       | 258           | 492 | 750  | 30.00 |      |                 |                                |

|  |          | Republic of Iraq - Ministry of Higher Education and Scientific Research<br>University of Babylon<br>Bachelor's degree in chemistry science (First cycle)<br>Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr<br>Program Curriculum (2024 - 2025) |                                     |                          |                     |          | جمهورية العراق - وزارة التعليم العالي والبحث العلمي<br>جامعة بابل<br>بكالوريوس في علوم الكيمياء (الدورة الأولى)<br>أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة<br>المناهج الدراسي للعام ٢٠٢٤-٢٠٢٥ |             |            |           |            |             |             |             |              |            |  |             |                             |
|------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|---------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|-----------|------------|-------------|-------------|-------------|--------------|------------|---------------------------------------------------------------------------------------|-------------|-----------------------------|
| Level                                                                              | Semester | No.                                                                                                                                                                                                                                                              | Module Code                         | Module Name in English   | اسم المادة الدراسية | Language | SSVL (hr/w)                                                                                                                                                                                                                            |             |            |           |            |             |             |             |              |            | ECTS                                                                                  | Module Type | Prerequisite Module(s) Code |
|                                                                                    |          |                                                                                                                                                                                                                                                                  |                                     |                          |                     |          | CL (hr/w)                                                                                                                                                                                                                              | Lect (hr/w) | Lab (hr/w) | Pr (hr/w) | Tut (hr/w) | Semn (hr/w) | Exam hr/sem | SSVL hr/sem | USSVL hr/sem | SVL hr/sem |                                                                                       |             |                             |
| One                                                                                | 1        | CHEM2311                                                                                                                                                                                                                                                         | Chemistry of represented elements 1 | كيمياء العناصر الممثلة ١ | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           |                             |
|                                                                                    | 2        | CHEM2302                                                                                                                                                                                                                                                         | Gravimetric analysis                | التحليل الوزني           | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           |                             |
|                                                                                    | 3        | CHEM2313                                                                                                                                                                                                                                                         | Thermodynamics1                     | الديناميكية الحرارية ١   | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           |                             |
|                                                                                    | 4        | CHEM2314                                                                                                                                                                                                                                                         | Organic Chemistry1                  | الكيمياء العضوية ١       | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           |                             |
|                                                                                    | 5        | CHEM2305                                                                                                                                                                                                                                                         | Differential equations              | المعادلات التفاضلية      | English             | 2        | 0                                                                                                                                                                                                                                      | 0           | 0          | 0         | 0          | 0           | 3           | 33          | 42           | 75         | 3.00                                                                                  | S           |                             |
|                                                                                    | 6        |                                                                                                                                                                                                                                                                  | Computer 2                          | الحاسوب ٢                | English             | 2        | 0                                                                                                                                                                                                                                      | 0           | 0          | 0         | 0          | 0           | 3           | 33          | 42           | 75         | 3.00                                                                                  | S           |                             |
|                                                                                    | Total    |                                                                                                                                                                                                                                                                  |                                     |                          |                     |          | 12                                                                                                                                                                                                                                     | 0           | 8          | 0         | 0          | 0           | 0           | 18          | 318          | 432        | 750                                                                                   | 30.00       |                             |
| Two                                                                                | 1        | CHEM2401                                                                                                                                                                                                                                                         | Chemistry of represented elements 2 | كيمياء العناصر الممثلة ٢ | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           | CHEM2311                    |
|                                                                                    | 2        | CHEM2402                                                                                                                                                                                                                                                         | Separation Methods                  | طرق الفصل                | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           |                             |
|                                                                                    | 3        | CHEM2403                                                                                                                                                                                                                                                         | Thermodynamics 2                    | الديناميكية الحرارية ٢   | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           | CHEM2313                    |
|                                                                                    | 4        | CHEM2404                                                                                                                                                                                                                                                         | Organic Chemistry 2                 | الكيمياء العضوية ٢       | English             | 2        | 0                                                                                                                                                                                                                                      | 2           | 0          | 0         | 0          | 0           | 3           | 63          | 87           | 150        | 6.00                                                                                  | C           | CHEM2314                    |
|                                                                                    | 5        | UOBAB2301                                                                                                                                                                                                                                                        | Baath Party crimes                  | جرائم البعث البائد       | Arabic              | 2        | 0                                                                                                                                                                                                                                      | 0           | 0          | 0         | 0          | 0           | 3           | 33          | 17           | 50         | 2.00                                                                                  | S           |                             |
|                                                                                    | 6        | UOBAB2302                                                                                                                                                                                                                                                        | English LanguageII                  | اللغة الانكليزية II      | English             | 2        | 0                                                                                                                                                                                                                                      | 0           | 0          | 0         | 0          | 0           | 3           | 33          | 17           | 50         | 2.00                                                                                  | S           |                             |
|                                                                                    | 7        | UOBAB1102                                                                                                                                                                                                                                                        | Arabic Language                     | اللغة العربية            | Arabic              | 2        | 0                                                                                                                                                                                                                                      | 0           | 0          | 0         | 0          | 0           | 3           | 33          | 17           | 50         | 2.00                                                                                  | B           |                             |
| Total                                                                              |          |                                                                                                                                                                                                                                                                  |                                     |                          |                     | 12       | 0                                                                                                                                                                                                                                      | 8           | 0          | 0         | 0          | 0           | 18          | 318         | 432          | 750        | 30.00                                                                                 |             |                             |



المواد الدراسية وعدد الوحدات للمرحلة الثالثة لقسم الكيمياء - كلية العلوم للثقات - جامعة بابل للعام الدراسي 2024 - 2025

| المرحلة الثالثة - الفصل الأول  |                   |      |                              |                           |
|--------------------------------|-------------------|------|------------------------------|---------------------------|
| عدد الوحدات                    | الساعات الأسبوعية |      | اسم المادة باللغة الانكليزية | اسم المادة باللغة العربية |
|                                | تعليمي            | نظري |                              |                           |
| 3                              | 2                 | 2    | Physical Chemistry-1         | الكيمياء الفيزيائية-1     |
| 3                              | 2                 | 2    | Organic Chemistry-1          | الكيمياء العضوية-1        |
| 3                              | 2                 | 2    | Inorganic Chemistry-1        | الكيمياء اللاعضوية-1      |
| 3                              | 2                 | 2    | Biochemistry-1               | الكيمياء الحياتية-1       |
| 2                              | -                 | 2    | Industrial Chemistry-1       | الكيمياء الصناعية-1       |
| 2                              | -                 | 2    | Environmental                | البيئة                    |
| 2                              | -                 | 2    | English Language-3           | اللغة الانكليزية-3        |
| المرحلة الثالثة / الفصل الثاني |                   |      |                              |                           |
| عدد الوحدات                    | الساعات الأسبوعية |      | اسم المادة باللغة الانكليزية | اسم المادة باللغة العربية |
|                                | تعليمي            | نظري |                              |                           |
| 3                              | 2                 | 2    | Physical Chemistry-2         | الكيمياء الفيزيائية-2     |
| 3                              | 2                 | 2    | Organic Chemistry-2          | الكيمياء العضوية-2        |
| 3                              | 2                 | 2    | Inorganic Chemistry-2        | الكيمياء اللاعضوية-2      |
| 3                              | 2                 | 2    | Biochemistry-2               | الكيمياء الحياتية-2       |
| 2                              | -                 | 2    | Industrial Chemistry-2       | الكيمياء الصناعية-2       |
| 2                              | -                 | 2    | Nanotechnology               | تكنولوجيا النانو          |

المواد الدراسية وعدد الوحدات للمرحلة الرابعة لقسم الكيمياء – كلية العلوم للبنات – جامعة بابل للعام الدراسي 2024 – 2025

المرحلة الرابعة- الفصل الاول

| عدد الوحدات | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية | اسم المادة باللغة العربية     |
|-------------|-------------------|------|------------------------------|-------------------------------|
|             | نظري              | عملي |                              |                               |
| 3           | 2                 | 2    | Instrumental analysis -1     | التحليل الالي-1               |
| 2           | -                 | 2    | Quantum Chemistry            | كيمياء الكم                   |
| 3           | 2                 | 2    | Industrial Chemistry-1       | الكيمياء الصناعية-1           |
| 3           | 2                 | 2    | Bio clinical chemistry-1     | الكيمياء الحياتية السريرية- 1 |
| 2           | -                 | 2    | Heterocyclic                 | حلقية غير متجانسة             |
| 2           | -                 | 2    | English Language-4           | اللغة الانكليزية-4            |
| 2           | -                 | 2    | Research project             | مشروع بحث                     |

المرحلة الرابعة /الفصل الثاني

| عدد<br>الوحدات | الساعات الاسبوعية |      | اسم المادة باللغة الانكليزية        | اسم المادة باللغة العربية     |
|----------------|-------------------|------|-------------------------------------|-------------------------------|
|                | نظري              | عملي |                                     |                               |
| 3              | 2                 | 2    | Instrumental analysis -2            | التحليل الالي-2               |
| 2              | -                 | 2    | Spectroscopy                        | الاطياف                       |
| 3              | 2                 | 2    | Industrial Chemistry-2              | الكيمياء الصناعية-2           |
| 3              | 2                 | 2    | Bio clinical chemistry-2            | الكيمياء الحياتية السريرية- 2 |
| 2              | -                 | 2    | Photochemistry                      | كيمياء الضوء                  |
| 4              | 6                 | 2    | Identification of organic chemistry | كيمياء التشخيص العضوي         |

## 8.The expected learning outcomes of the program

### Knowledge

#### Knowledge and Understanding

- 1- 1. The student gets to know the concept of chemistry
- 2- 2. To classify the needs for developing chemistry
- 3- 3. To separate the chemical specifications according to the ISO system
- 4- 4. To evaluate the cost of maintaining chemical manufacturing equipment

### Skills

#### Subject-Specific Skills

- .1The student's knowledge of the concept of chemistry
- .2The importance of chemistry in areas of life
3. Enabling female students to analyze the costs of working in the chemical industry

#### Thinking Skills

- .1Thinking skill according to the student's ability (the goal of this skill is for the student to believe in what is tangible (the student's abilities) and understand when, what and how he should think and work to improve the ability to think reasonably(
- .2 High thinking skill (the goal of this skill is to teach thinking well before making the decision that determines the student's life(
3. Critical thinking skills (a term that symbolizes the highest levels of thinking, which aims to pose a problem and then analyze it

المقدمة

### Ethics

|                    |                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------|
| Evaluation methods | 1- Exams<br>2- Learning Matrix<br>3- Which Face<br>4- CAT (student feedback)<br>5- Learning Triangle |
|--------------------|------------------------------------------------------------------------------------------------------|

## ***9. Teaching and Learning Strategies***

### ***Learning strategies***

- 1-Thinking strategy according to the student's ability (for example: if the student is able to learn the correct concept of management, he will acquire the skill of managing and organizing his personal life).
- 2- High thinking skill strategy (for example, if the student wants to make a good decision, it is important that he thinks well before he makes the decision, and if he decides without thinking, or if he cannot think well, or if he cannot decide, or perhaps he will not decide, then this This means he does not have high thinking skills.)
- 3- Critical thinking strategy in learning (Critical Thanking) (It is a term that symbolizes the highest levels of thinking, which aims to pose a problem and then analyze it logically to reach the desired solution).
- 4-Brainstorming

### ***Methods of teaching and learning***

- 1- Method of giving lectures.
- 2- Student Center
- 3- Student groups
- 4- Workshops
- 5- (Scientific trips to follow up on the environmental reality)

6- Learning Technologies on Campus

7- (Experiential learning)

8- Application Learning)

### ***10. Evaluation methods***

1- Exams

2- Learning Matrix

3- Which Face

4- CAT (student feedback)

5- Learning Triangle

### ***11. Faculty***

***Faculty Members***

| <i>Academic Rank</i> | <i>Instructor's name</i>     | <i>Specialization</i> |                           | <i>Special Requirements/skills (it applicable)</i> | <i>Number of the teaching staff</i> |                 |
|----------------------|------------------------------|-----------------------|---------------------------|----------------------------------------------------|-------------------------------------|-----------------|
|                      |                              | <i>General</i>        | <i>Special</i>            |                                                    | <i>staff</i>                        | <i>lecturer</i> |
| Professor            | Dr. Hazim Yahya Mohammed Ali | Chemistry             | Physical Chemistry        |                                                    | √                                   |                 |
| Professor            | Dr. Ayad Fahdil Mohammed     | Chemistry             | Physical Chemistry        |                                                    | √                                   |                 |
| Professor            | Dr. Mohammed Hamid Saa'id    | Chemistry             | Inorganic Chemistry       |                                                    | √                                   |                 |
| Professor            | Dr. Talat Tariq Kahlil       | Chemistry             | Bio Chemistry             |                                                    | √                                   |                 |
| Professor            | Dr. Sadiq Abed Al hussain    | Chemistry             | Organic Chemistry/Polymer |                                                    | √                                   |                 |
| Professor            | Dr. Fuad Fahdil Mohammed     | Chemistry             | Analytical Chemistry      |                                                    | √                                   |                 |
| Professor            | Dr. Assyl Moshtaq Kahdim     | Chemistry             | Analytical Chemistry      |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Noor Abed Al razaq       | Chemistry             | Organic Chemistry         |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Suad Taha Saad           | Chemistry             | Inorganic Chemistry       |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Ahmed Hassan Shintaf     | Chemistry             | Organic Chemistry         |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Ali Talib Bader          | Chemistry             | Inorganic Chemistry       |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Zainab Hashim Khudaier   | Chemistry             | Analytical Chemistry      |                                                    | √                                   |                 |
| Assistant Professor  | Dr. Ziyad Omran Musaa        | Chemistry             | Organic Chemistry         |                                                    | √                                   |                 |

|                   |                      |           |                      |  |   |  |
|-------------------|----------------------|-----------|----------------------|--|---|--|
| Teacher           | Mohammed Edan Hassan | Chemistry | Analytical Chemistry |  | √ |  |
| Teacher           | Ali Mohsum Mohammed  | Chemistry | Physical Chemistry   |  | √ |  |
| teacher           | Shiren Hamza Abbas   | Chemistry | Bio Chemistry        |  | √ |  |
| assistant teacher | Rana Salah Norri     | Chemistry | Bio Chemistry        |  | √ |  |

## ***Professional Development***

### ***Mentoring new faculty members***

Teaching, like any other art, can be acquired by practicing and following its methods and principles, provided that there is a sincere desire to practice the teaching profession, and the method in education means taking interconnected steps to reach a specific goal that you hope to achieve. Therefore, it must follow the basic principles of good teaching, which are:

- 1- Directing and guiding learners by creating educational situations that lead to desirable activities.
- 2- Providing an atmosphere of love, kindness and cooperation between the teacher and the learners and between the learners themselves through his love for his students without discrimination and not excessive feminization.
- 3- Adopting democratic leadership through the emotional relationship between the teacher and his students, which leads them to control based on mutual respect and creating a cooperative atmosphere between the students and between the teacher and his students.

### ***Professional development for faculty members***

- 1- Thinking strategy according to the student's ability (for example: if the student is able to learn the correct concept of management, he will acquire the skill of managing and organizing his personal life). And the high thinking skill strategy (for example, if the student wants to make a good decision, it is important that he thinks well before he makes the decision, and if he decides without thinking or if he cannot think well or if he cannot decide or perhaps he will not decide, this means He does not have high thinking skills.)
- 2- General and transferable skills (other skills related to employability and personal development).

3- Verbal communication.

4- Teamwork.

5- Analysis and investigation (collecting information systematically and scientifically to establish facts and principles for solving the problem).

## ***12. Acceptance criterion***

Central acceptance and parallel acceptance

## ***13. The most important sources of information about the program***

1- The website of the college and university.

<https://csg.uobabylon.edu.iq/>

<https://csg.uobabylon.edu.iq/department/?cdid=4>

[https://csg.uobabylon.edu.iq/department/dep\\_lectures.aspx?cdid=4](https://csg.uobabylon.edu.iq/department/dep_lectures.aspx?cdid=4)

2- University guide <https://systems.uobabylon.edu.iq/>



3- The most important books and resources in the college library.

#### ***14. Program development plan***

The Bologna Process was applied to the students of the first stage, and work is being done to apply it to the next stages, along with conducting workshops and seminars to familiarize faculty members with the requirements of the Bologna Process and how to work with it, and to discuss the negatives and obstacles and find solutions for them. The electronic system was applied in the education process.

### Program skills Outline

|                                                                     |                    |                              |                          | <i>Required program learning outcomes</i> |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                                                                       |                      |                      |                      |
|---------------------------------------------------------------------|--------------------|------------------------------|--------------------------|-------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------------------------------------------------------|----------------------|----------------------|----------------------|
| <i>Year/Level</i>                                                   | <i>Course Code</i> | <i>Course Name</i>           | <i>Basic or optional</i> | <i>Knowledge</i>                          |                      |                      |                      | <i>Skills</i>        |                      |                      |                      | <i>Ethics</i>        |                      |                      |                      | <i>Other skills related to employability and personal development</i> |                      |                      |                      |
|                                                                     |                    |                              |                          | <i>A<sub>1</sub></i>                      | <i>A<sub>2</sub></i> | <i>A<sub>3</sub></i> | <i>A<sub>4</sub></i> | <i>B<sub>1</sub></i> | <i>B<sub>2</sub></i> | <i>B<sub>3</sub></i> | <i>B<sub>4</sub></i> | <i>C<sub>1</sub></i> | <i>C<sub>2</sub></i> | <i>C<sub>3</sub></i> | <i>C<sub>4</sub></i> | <i>D<sub>1</sub></i>                                                  | <i>D<sub>2</sub></i> | <i>D<sub>3</sub></i> | <i>D<sub>4</sub></i> |
| <b>The first stage, Course (1), according to the Bologna system</b> |                    | Qualitative Analytical chem. | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                                                     |                    | Inorganic -1                 | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                                                     |                    | Cytology                     | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                                                     |                    | Laboratory safety            | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                                                     |                    | Human and Democracy          | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                                                     |                    | Arabic Language              | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |

### Program skills Outline

|                                                              |             |                             |                   | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|--------------------------------------------------------------|-------------|-----------------------------|-------------------|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------|----------------|----------------|----------------|
| Year/Level                                                   | Course Code | Course Name                 | Basic or optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to employability and personal development |                |                |                |
|                                                              |             |                             |                   | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                 | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| The first stage, Course (2), according to the Bologna system |             | Volumetric Analytical chem. | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                                                              |             | Inorganic -2                | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                                                              |             | Mathematics                 | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                                                              |             | Physics Sciences            | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                                                              |             | Computers Program           | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                                                              |             | English Language            | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |

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### Program skills Outline

|                            |                             |                                              |                   | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|----------------------------|-----------------------------|----------------------------------------------|-------------------|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------|----------------|----------------|----------------|
| Year/Level                 | Course Code                 | Course Name                                  | Basic or optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to employability and personal development |                |                |                |
|                            |                             |                                              |                   | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                 | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| Second stage<br>Course (1) | Sg Lph Gopt<br>201401 (2,2) | Chemistry of<br>representative<br>elements 1 | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |                             | Gravimetric<br>analysis                      | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |                             | Thermodynamics<br>-1                         | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |                             | Organic<br>Chemistry-1                       | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |                             | Differential<br>Equations                    | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |

|                         |             | Computer sciences-2                    | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
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|                         |             | Baath Partycrimes                      | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                         | —           |                                        |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|                         | —           |                                        |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
| Program skills Outline  |             |                                        |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|                         |             |                                        |                   | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
| Year<br>/Level          | Course Code | Course Name                            | Basic or optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to employability and personal development |                |                |                |
|                         |             |                                        |                   | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                 | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| Second stage Course (2) |             | Chemistry of representative elements 2 | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                         |             | Separation Methods                     | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                         |             |                                        | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                         |             | Thermodynamics 2                       | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                         |             | Organic Chemistry-2                    | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |

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|  |  | English Language-2 | Basic | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
|  |  |                    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
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| Program skills Outline     |             |                       |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|----------------------------|-------------|-----------------------|-------------------|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------|----------------|----------------|----------------|
|                            |             |                       |                   | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
| Year /Level                | Course Code | Course Name           | Basic or optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to employability and personal development |                |                |                |
|                            |             |                       |                   | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                 | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| The third stage Course (1) |             | Physical Chemistry-1  | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |             | Organic Chemistry-1   | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |             | Inorganic Chemistry-1 | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |             | Biochemistry-1        | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                            |             | Industrial            | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |

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|  |  | Chemistry-1        |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  |  | Environmental      | Basic | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
|  |  | English Language-3 | Basic | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
|  |  |                    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

| <i>Program skills Outline</i>     |                    |                        |                          |                                           |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                                                                       |                      |                      |                      |
|-----------------------------------|--------------------|------------------------|--------------------------|-------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------------------------------------------------------|----------------------|----------------------|----------------------|
|                                   |                    |                        |                          | <i>Required program learning outcomes</i> |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                                                                       |                      |                      |                      |
| <i>Year /Level</i>                | <i>Course Code</i> | <i>Course Name</i>     | <i>Basic or optional</i> | <i>Knowledge</i>                          |                      |                      |                      | <i>Skills</i>        |                      |                      |                      | <i>Ethics</i>        |                      |                      |                      | <i>Other skills related to employability and personal development</i> |                      |                      |                      |
|                                   |                    |                        |                          | <i>A<sub>1</sub></i>                      | <i>A<sub>2</sub></i> | <i>A<sub>3</sub></i> | <i>A<sub>4</sub></i> | <i>B<sub>1</sub></i> | <i>B<sub>2</sub></i> | <i>B<sub>3</sub></i> | <i>B<sub>4</sub></i> | <i>C<sub>1</sub></i> | <i>C<sub>2</sub></i> | <i>C<sub>3</sub></i> | <i>C<sub>4</sub></i> | <i>D<sub>1</sub></i>                                                  | <i>D<sub>2</sub></i> | <i>D<sub>3</sub></i> | <i>D<sub>4</sub></i> |
| <b>The third stage Course (2)</b> |                    | Physical Chemistry-2   | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                   |                    | Organic Chemistry-2    | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                   |                    | Inorganic Chemistry-2  | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                   |                    | Biochemistry-2         | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                   |                    | Industrial Chemistry-2 | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |
|                                   |                    | Nanotechnology         | Basic                    | *                                         | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                    | *                                                                     | *                    | *                    | *                    |

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| Program skills Outline      |             |                          |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
|-----------------------------|-------------|--------------------------|-------------------|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------|----------------|----------------|----------------|
|                             |             |                          |                   | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |
| Year<br>/Level              | Course Code | Course Name              | Basic or optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to employability and personal development |                |                |                |
|                             |             |                          |                   | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                 | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| The fourth stage Course (1) |             | Instrumental analysis -1 | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             | Quantum Chemistry        | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             |                          | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             | Industrial Chemistry-1   | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             | Biochemistry-1           | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             | Heterocyclic             | Basic             | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                              | *              | *              | *              |
|                             |             | English Language-4       |                   |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                |                |                |                |



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|  | — | Research<br>Methodology |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Program skills Outline                  |             |                                        |                      |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                      |                |                |                |
|-----------------------------------------|-------------|----------------------------------------|----------------------|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------------|----------------|----------------|----------------|
|                                         |             |                                        |                      | Required program learning outcomes |                |                |                |                |                |                |                |                |                |                |                |                                                                      |                |                |                |
| Year<br>/Level                          | Course Code | Course Name                            | Basic or<br>optional | Knowledge                          |                |                |                | Skills         |                |                |                | Ethics         |                |                |                | Other skills related to<br>employability and<br>personal development |                |                |                |
|                                         |             |                                        |                      | A <sub>1</sub>                     | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>4</sub> | D <sub>1</sub>                                                       | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> |
| The<br>fourth<br>stage<br>Course<br>(2) |             | Instrumental<br>analysis -2            | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             | Spectroscopy                           | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             | Industrial<br>Chemistry-2              | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             | Biochemistry-2                         | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             | Photochemistry                         | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             | Identification of<br>organic chemistry | Basic                | *                                  | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *              | *                                                                    | *              | *              | *              |
|                                         |             |                                        |                      |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                      |                |                |                |
|                                         |             |                                        |                      |                                    |                |                |                |                |                |                |                |                |                |                |                |                                                                      |                |                |                |