Ministry of Higher Education and Scientific ResearchScientific Supervision and Scientific Evaluation ApparatusDirectorate of Quality Assurance and Academic AccreditationDepartment

Academic Programand CourseDescription Guide

2024

Academic Program Description Form

University Name: Babylon University

Faculty / Institute: College of Materials Engineering

Scientific Department: Department of Polymer Engineering &Petrochemical Industry

Academic Professional Program Name: Department of Polymer Engineering &Petrochemical Industry

Final Certificate Name: Bachelor

Academic System: Quarterly

Description Preparation Date: 2025/3/

Completion Date: 2025/3/

Signature:

Head of Department Name:

Dr. Ammar Emad Kazem Jaber Al-Kawaz

Date: 2025/3/

Signature:

Scientific Associate Name:

Dr. Auda Jabbar Braihi Hasson

Date: 2025/3/

The file is checked by:

Department of Quality Assurance and University Performance

DirectoroftheQualityAssuranceandUniversityPerformanceDepartment:

Date:

Signature:

Approval of the Dean

Prof. Dr. Abdul Raheem K. Abid Ali

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

1. Program Vision

The department of polymer and petrochemical industries aims to create new branch specializes with polymer material engineering, composite material engineering, rubber engineering and petrochemical engineering. On the other hand, the majored of students in high studies is carried out at the same scientific branches.

2. Program Mission

The department of polymer engineering and petrochemical industries is concerned with (polymers, composites, rubber, oil, petrochemical industries, other materials as metals and their alloys) in order to supply the traditional engineering study with design and selection of engineering materials as well as manufacturing and innovation according to modern techniques which proportionate with (easiness of production, availability, low cost) of polymers. This department qualifies the graduates for scientific research as well as imparts them skills for working in factories and laboratories of engineering material identification and inspection.

3. Program Objectives

1- Preparing competent and qualified engineers to work in the various engineering and industrial sectors
2- Preparing engineers capable of working in the formations of the Ministry of Industry and Minerals
3- Supplying the surrounding factories and laboratories with qualified engineers, such as the Babylon tire and medical syringe factory
4- Can work as consultants and examiners for various polymeric and petroleum materials
5-Preparing qualified engineers to work in the petrochemical and oil industries

Institution

Requirements

College

Requirements

4. **Program Accreditation**
There is a presentation in order to obtain program accreditation

5. **Other external influences**
1-visits in fieldwork 2-the experimental part 3-scientific consulting 4-Lbraries and Internet network 5-podiums of social media 6-the need of work market

6. **Program Structure**

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Enterprise requirements				___
Department requirements				___
summer training				___
Other	___	___	___	___

* This can include notes whether the course is basic or optional.

7. Program Description

Year / level	Course Code	Course name	Credit hours	
			theoretical	practical
level UGI / Semester one	**Mechanical Behavior of Polymers I**	**311.MEP**	3	2
3rd stage / first Semester	**Surface Eng.**	**313. MEP**	2	2
3rd stage / first Semester	**Rheology of Polymers- I**	**314. MEP**	2	2
3rd stage / first Semester	**Eng. Analyses**	**315. MEP**	4	-
3rd stage / first Semester	**Heat Transfer**	**316. MEP**	3	2
3rd stage / first Semester	**Petrochemical Industries**	**318. MEP**	2	-
3rd stage / first Semester	**Biopolymers**	**319. MEP**	3	-
3rd stage / first Semester	**Eng. Language I**		2	-
3rd stage /second Semester	**Mechanical Behavior of Polymers II**	**321.MEP**	3	2
3rd stage / second Semester	**Nondestructive Tests**	**322. MEP**	2	2
3rd stage / second Semester	**Paint and Adhesives**	**323. MEP**	2	2
3rd stage / second Semester	**Rheology of Polymer- I I**	**324. MEP**	2	2
3rd stage / second Semester	**Numerical Analyses**	**325. MEP**	4	-
3rd stage / second Semester	**Mass Transfer**	**326. MEP**	3	-
3rd stage / second Semester	**Reactors Engineering Chemical**	**327. MEP**	3	-
3rd stage / second Semester	**Scientific Research**	**329. MEP**	2	-
3rd stage / second Semester	**Eng. Language-II**		2	-
4th stage / first Semester	**Technology of Polymers**	**411.MEP**	2	2
4th stage / first Semester	**Design and Selection of Eng. Materials- I**	**413.MEP**	3	2
4th stage / first Semester	**Industrial. Eng**	**414. MEP**	2	-
4th stage / first Semester	**Process Control-I**	**416 MEP.**	2	-
4th stage / first Semester	**Rubber Engineering**	**417. MEP**	2	2
4th stage / first Semester	**Polymer blends**	**418. MEP**	2	-
4th stage / first Semester	**Eng. Language-I**		2	-
4th stage / second Semester	**Technology of Composite Materials**	**411.MEP**	2	2
4th stage / second Semester	**Technology of Petrochemical Industries**	**412. MEP**	2	-
4th stage / second Semester	**Design and Selection of Eng. Materials- II**	**413. MEP**	3	2

4th stage / second Semester	**Quality Control**	**414. MEP**	2	-
4th stage / second Semester	**Process Control- II**	**416. MEP**	2	-
4th stage / second Semester	**Recycling of polymers**	**418. MEP**	2	2
4th stage / second Semester	**Eng. Language-II**		2	-

8. Expected learning outcomes of the program

Knowledge	
A. Learning Outcomes 1 Cognitive goals A1- Understand basic engineering concepts A2- Studying the general concepts of engineering in general A3- Studying and knowing the engineering of materials of all kinds and their field of application A4- Focusing on polymeric and rubber materials and their products A5- Knowledge of the basics of petroleum engineering and petrochemical industries A 6-Knowing general priorities about petroleum products	Learning Outcomes Statement 1
Skills	
B.The skills goals special to the programme . B1 - Skill in reading and analyzing all engineering plans and designs	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5
B2 - Full knowledge of the properties and uses of materials and their selection for specific applications B3 - Complete knowledge of engineering polymers, petroleum products and products derived from them	
Ethics	
1-Establishing the supreme ethics in society 2-preservation of vocation ethics and work mystery 3-Employment of English language in consolidating national culture 4-accept the favorably aspects in other cultures	

9. Teaching and Learning Strategies

Develop all available human and laboratory resources to teach students and mentally stimulate them in order to increase their scientific and engineering skills.
1- Giving lectures directly to students
2- E-learning by displaying lectures attached to explanatory forms and videos
3- Scientific trips
4- Assigning students to research as seminars and practical scientific research
5- Training in laboratories and factories

10. Evaluation methods

1- Written and oral exams
2- Practical exams
3-Dialogue and direct questions during the lecture time
4- Direct and surprising questions for students

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching st	
	General	Special			Staff	Lecturer
Prof.Najm Abdel Amir Saeed	Production and Metals	Formation of Composite Materials	—	—	✓	—
Prof.Nizar Jawad Hadi	, Mechanical Engineering	Fluids and Rheology	—	—	✓	—
Prof.Ali Abdel Amir Al-Zubaidi	Machinery and Equipment Engineering	Technology and Recycling	—	—	✓	—
Zulfikar Karim Mazal	Materials engineering	Polymer and Composites Engineering	—	—	✓	—
Prof.Auda Jabbar Brahi	Materials engineering	Polymeric materials engineering	—	—	✓	—
Prof.Massar Najm Obaid	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Prof.Hanaa Jawad Kazem Ali	Materials Technologies	Nanotechnology	—	—	✓	—
Prof.Ahmed Fadel Hamza	Materials engineering	Polymeric composite materials	—	—	✓	—
Prof. Saleh Abbas Habib	Chemical Engineering	Nanopolymer technology	—	—	✓	—
Prof. Ammar Imad Kazem	Materials engineering	Nanopolymer technologies	—	—	✓	—
Prof. Israa Ali Hussein	Materials engineering	Polymer composite engineering	—	—	✓	—
Assist. Prof. Ali Salah Hassan	Physics Science	Nanotechnology	—	—	✓	—
Assist. Prof. Hussein Mohammed Salman	Information Technology	Software	—	—	✓	—
Assist. Prof. Muhammad Jawad Hadi	Physics Science	Electro-optics	—	—	✓	—

Lect.Ali Abdel Kazem Hussein	Production engineering	Nanofabrication engineering	—	—	✓	—
Lect.Qasim Ahmed	Laser	Nano technology	—	—	✓	—
Lect.Qusay Adnan Mahdi	Mechanical Engineering	Thermal engineering	—	—	✓	—
Lect.Russul.Muhammad Abd al-Rida	Materials engineering	Composite polymeric materials	—	—	✓	—
Lect.Ola Abdul Hussein Kazem	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect.Duaa Abdul Reda Musa	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect.Nabil Hassan Hamid	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Assist. Prof. Abeer Adnan Abdel	Materials engineering	Plastics	—	—	✓	—
Assist. Prof. Dr. Lina Fadhil Kadhim	Materials engineering	Composite and polymeric materials	—	—	✓	—
Assist. Prof Muhammad Kazem Hamza	Mechanical Engineering	Heat transfer	—	—	✓	—
Lect OhoodHamizaSabr	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect Nardine Adnan Berto	Chemistry Science	organic chemistry	—	—	✓	—
Assist. Lect. Nawar Saadi Abdel	Mechanical/power and aviation engineering	Capacity engineering	—	—	✓	—
Zainab Abdel Amir Jodi	Chemical engineering	Oil and gas refining	—	—	✓	—
Assist. Lect. Mustafa Ghanem Hamid Al-Talbi	Materials engineering	Polymer and composite materials	—	—	✓	—

		engineering				
Assist. Lect. Atheer Hussein Mahdi	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect. Ban Jawad Kadhim	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect. Mustafa Abdalhusseinmusfair	Materials engineering	Polymer and composite materials engineering	—	—	✓	—
Lect. Dhay Jawad Muhammad	Materials engineering	Polymer and composite materials engineering	—	—	✓	—

Professional Development

Mentoring new faculty members

1-Guidance the new faculty members through predisposing (symposiums, courses, definitional workshops, validity of teaching of new lectures, working of periodicity meetings) in order to identify them with work contexts.
2-daily guidance and supervising, continuous pursuing, give the dissuading and Guidance, induce on the writing of scientific researches, participation in specialism Conferences for developing their scientific and academiccapabilities

Professional development of faculty members

1-providant the required environment and resources for developing the skills Faculty members and consequently reaching to maximum degree of quality in academic performance.
2-the participating in (workshops, continuous teaching sessions, specialism training courses).
3-Development the skills of faculty members in studteents almanac and depending on effective replacements in that field
3- Development the skills of faculty members by depending on modern technology

And innovation of new replacements in learning and teaching.
4-elevating the level of faculty members (scientific research, vocational training, management, service of society)
5-exchanging the expertise between faculty members in the scientific department and corresponding departments natively and globally.
6-development the numerous managing skills at faculty members like team work or skills of decision take-apart through the academic and managing work.
7-development the skills of faculty members for treating with challenges that faced them during their academic and functional tasks as well as grovels the potential functional difficulties.

12. Acceptance Criterion

The acceptance is Central through direct presentation on the official site of high education and scientific research

13. The most important sources of information about the program

1- Specialized Arabic and foreign sources
2- Scientific and research journals
3- Lectures by international professors
4-the site of high education and scientific research ministry
5-Theelectronic site of (university, college, department).
6-brochur of student .

14. Program Development Plan

1-working due to ministry and university recommendations that related with developing the academic program of department

2-the revision and almanac by periodic scientific commission to the academic program and its recommendations or proposals that built on annual reports of programs and courses descriptions

3-Development the performance of scientific and managing staff in the department

Through files of annual performance almanac that reveals the points of strength and weakness

4-Carrying out the almanac studies that related with developing and improving the performance of department staff and workers

5-attendance of seminars and specialized scientific symposiums.

Program Skills Outline

Course Code	Course Name	Basic or optional	RequiredprogramLearningoutcom									
			Knowledge				Skills					
			A1	A2	A3	A4	B1	B2	B3	B4	C1	C
311.MEP	Mechanical Behavior of Polymers I	Basic			■	■		■	■		■	
313. MEP	Surface Eng.	Basic	■			■	■		■		■	
314. MEP	Rheology of Polymers- I	Basic		■			■			■		
315. MEP	Eng. Analyses	Basic			■	■	■	■				
316. MEP	Heat Transfer	Basic	■				■				■	
318. MEP	Petrochemical Industries	Basic										
319. MEP	Biopolymers	Basic	■			■		■	■		■	■
	Eng. Language	Basic			■	■		■	■		■	
321.MEP	Mechanical Behavior of Polymers	Basic	■			■	■		■		■	
322. MEP	Nondestructive Tests	Basic	■	■		■		■	■	■	■	■
323. MEP	Paint and Adhesives	Basic			■	■		■		■		
324. MEP	Rheology of Polymer- II	Basic	■				■				■	
325. MEP	Numerical Analyses	Basic		■			■			■		
326. MEP	Mass Transfer	Elective										
327. MEP	Reactors Engineering Chemical	Elective										
329. MEP	Scientific Research	Basic		■			■		■	■		■
	Eng. Language-II	Basic			■	■		■		■		
411.MEP	Technology of Polymers	Basic		■	■	■		■	■	■	■	
413.MEP	Design and Selection of Eng. Materials- I	Basic			■	■	■		■	■	■	■
414. MEP	Industrial. Eng	Basic	■			■			■	■		
416 MEP.	Process Control-I	Basic	■	■		■	■	■	■	■	■	■
417. MEP	Rubber Engineering	Basic	■					■				■
418. MEP	Polymer blends	Basic		■		■			■	■	■	■
	Eng. Language-I	Basic	■			■				■		
411.MEP	Technology of Composite Materials	Basic			■					■		■
412. MEP	Technology of Petrochemical Industries	Basic	■	■		■	■	■	■	■	■	■
413. MEP	Design and Selection of Eng. Materials- II	Basic	■	■		■			■	■	■	■
414. MEP	Quality Control	Basic	■					■				■

416. MEP	**Process Control- II**	Basic										
418. MEP	**Recycling of polymers**	Basic										
	Eng. Language-II	Basic										

- **Pleasetickthebo xescorrespondingtotheindividualprogramlearningoutcomes underevaluation.**

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Surfaces Engineering \ 313. MEP
4. Modes of Attendance offered	weekly
5. Semester/Year	first semester /third year
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20-9-2024
8. Aims of the Course	
A - Understand the principles and basics of surface engineering	
B - The student's dependence on scientific skills and their support in the practical aspect.	
C - Enabling the student to know the mechanisms of evaluating and studying surfaces	
E - Enable the student to know the techniques of treating and preparing surfaces for paints and	

adhesives
E - Enable the student to study the mechanical and rheological properties of polymer surfaces and coatings

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals
A1- Introduction to surfaces and methods of examination
A2- Understand the relationship between surface tension, surface energy, contact angle and hydration
A3- Know the mechanical state of the surface.
A4- Introduce the student to the effect of surface friction and surface lubrication factors

B. The skills goals special to the course. B1 - Prior knowledge of surface treatment and coating technology
B2 - Study of surface coating properties
B3 - Knowledge of the principles of selection and design
B4-

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Skills of solving mathematical problems, differential and integral equations, and the use of advanced applied mathematics
D 2- The skill of engineering drawing and descriptive geometry
D3 - Modeling skills
D4 - Deduce and predict results
D 5- CV preparation skills
D6- Corporate communication skills
D 7- The skill of preparing the economic feasibility of projects
D8- Skills of providing scientific advice

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 hr	Knowing the objectives of studying surface engineering	Introduction to surface engineering	lecture	1- Give surprising questions 2- Classroom discussion
3-2	4hr	Techniques used to study and characterize surfaces	surface characterization techniques		
5-4	4hr	Study of surface tension, contact angle and wettability	Surface tension and its measurements		
6	2 hr	Study of mechanical properties of polymeric surfaces	mechanical state of the surface		
8-7	4hr	Study the properties of friction and modulus friction for polymers	Friction and coefficient of friction for polymers		
10-9	4hr	Study of the types of wear of polymeric surfaces	Wear		
11-12	4hr	Lubrication Techniques Study	Lubrication		
13-14	4hr	Study of coating techniques and mechanical properties of coatings	Coatings		
15	2 hr	The study of the properties of Surfactants	Surfactants		

11. Infrastructure

1. Books Required reading:	
2. Main references (sources)	1. Jamal Takadoum “Materials and Surface Engineering in Tribology.” John Wiley & Sons, Inc, USA, 2008. 2.Zhikang Xu, Xiaojun Huang, Lingshu Wan, “Surface Engineering of Polymer Membranes ", Zhejiang University Press, Hangzhou and Springer-Verlag GmbH Berlin Heidelberg.(2009) , 3.Manfred Stamm, “Polymer Surfaces and Interfaces ", First edition, Springer-Verlag Berlin Heidelberg.(2008) 4.Kenneth Holmberg and Allan Matthews, “COATINGS TRIBOLOGY”, Second Edition, 2009 . 5.Wypych, George, “Handbook of antiblocking, release, and slip additives ", ChemTec Publishing, 2005
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Google scholar

12. The development of the curriculum plan
a- Work in conformity with the existing curricula in international universities b- Follow up on the recent global developments that occur in this sector and reflect that in the lectures

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HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Chemical Reactors Engineering / **327. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second Semester / third year
6. Number of hours tuition (total)	45
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course Knowledge types of the reactors and their uses. such as ethylene, propylene and drives their performance equations and how to obtain maximum conversion by connecting them.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals

The course describes the reactor design and search to the optimum set-up to get higher conversion.

B. The skills goals special to the course. B1. Acquiring the skill in solving problems related to various types of chemical rectors design and their set-up.
B2. Gain the skill to solve all the issues that fall within the competence

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports related advanced topics.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think mor

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1-. Conducting a mini-action research on a problem related to the practical application aspect of oil refinery. .

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2	Reactor design	Reaction Rate Expression	e- lecture	1- Give surprising questions 2- Classroom discussion
3-4	2		Interpretation of Batch Reactor Data		
5-6	4		**Reaction Half - life**		
7-8	4		**Reversible and Irreversible Reactions**		
9	2		**Varying-Volume Batch Reactor**		
10-11	4		**Introduction to Reactor Design**		
12-13	4		**Design for Single Reactions**		
14	2		**Multiple-Reactor Systems**		
15	2		**Equal-Size MFRs in Series**		
16	2		**Mixed Flow Reactors of Different Sizes in Series**		

1. Books Required reading:	□ Basic texts □ Course Books □ other

2. Main references (sources)	1- chemical Reaction Engineering third edition,octave Levenspiel
A- Recommended books and references (scientific journals, reports…).	Modeling of chemical Kinetics and Reactor Design A.Kayode Coker
B-Electronic references, Internet sites…	Google scholar

12. The development of the curriculum plan
The course can be developed by looking at modern resources and the Internet.

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2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Petrochemical Industries / **318. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	First Semester /3rd year

6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20-9-2024
8. Aims of the Course Knowledge types of the petrochemicals and their uses and sources, such as ethylene, propylene and so on.	

9· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Cognitive goals

The course describes the petroleum products and their relationship with the crude oil.

B. The skills goals special to the course. B1. Acquiring the skill in solving problems related to various types of petrochemicals.
B2. Gain the skill to solve all the issues that fall within the competence.

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
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C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports related advanced topics.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
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Assessment methods

1- Direct and surprising questions for students.
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D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1-. Conducting a mini-action research on a problem related to the practical application aspect of oil refinery.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Ptrochemicals	Introduction	e- lecture	1- Give surprising questions 2- Classroom discussion
2	2		**Classification of Petrochemicals**		
3-4	4	Natural gas	**Natural Gas Treatment Processes**		
		Petrochemical industry	**Chemicals Based on Methane**		
6-7	4		**Basic Petrochemicals**		
8-9	4		**Ethylene, derivatives**		
10	2		❖ **Propylene, derivatives**		
11	2		**Butadiene, butylenes, and pygas, derivatives**		
12	2		Aromatics		
13	2		❖ **Toluene, benzene, polyurethane and phenolic Chain**		
14-15	4		**Synthesis gas (syngas)**		
16	2		**Nylons**		

1. Books Required reading:	□ Basic texts □ Course Books □ other
2. Main references (sources)	**Uttam Ray Chaudhuri "Fundamentals of Petroleum and Petrochemical Engineering." University of Calcutta Calcutta, India, 2011.**
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Google scholar

12. The development of the curriculum plan
The course can be developed by looking at modern resources and the Internet.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	mechanical behavior of polymers I / **311.MEP**
4. Modes of Attendance offered	weekly

5. Semester/Year	First semester / third year
6. Number of hours tuition (total)	75
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1 - Defining the student the effect of the polymer composition and its variables on the mechanical properties.	
2- Acquiring knowledge of the effect of (temperature - time - strain rate - additives) on the mechanical properties of the polymer.	
3- Knowing the effect of directing polymeric molecules on the properties of the polymer.	
4- Acquire knowledge of yield states, types of fracture, and how the behavior of the polymer changes from brittleness to ductility.	
5- Acquire skill in solving problems related to mechanical models and problems of fracture, fatigue and tensile strength in polymers.	

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals
A1. Thorough knowledge of the viscoelastic behavior of polymers.
A2. Thorough knowledge of deducing equations and models of viscoelastic behavior.
A3. Thorough knowledge of fracture mechanics and the nature of the fracture surface in polymers.
A4. Full knowledge of yield theories in polymers.

B. The skills goals special to the course. B1. Acquisition of skill in the derivations of mechanical models.
B2. Acquiring the skill in solving problems related to various types of fracture.
B3. Gain the skill to solve all the issues that fall within the competence

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1-. Conducting a mini-action research on a problem related to the practical application aspect of polymeric products. .

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
2-1	3	Understand the close relationship between polymer structure and its mechanical properties with the states of elasticity and viscoelasticity-elasticity in polymers	Effect of polymer structure on its mechanical properties.	lecture	1- Give surprising questions 2- Classroom discussion
4-3	3		The elastic behavior of polymers		
6-5	3		Linear viscoelastic behavior		
8-7	3	Develop mathematical models describing linear viscoelastic behavior with polymer-to-rubber similarity in a given region Learn how the polymer undergoes before failure	Mechanical models of viscoelsticity		
10-9	3		Non-linear viscoelastic behavior		
12-11	3		Rubber-like elasticity		
14-13	3		The yield behavior in polymers		
15	3		Yield criteria and cold drawing		

11. Infrastructure	
1. Books Required reading:	- Basic texts - Course Books - other
2. Main references (sources)	"An Introduction to The mechanical properties of solid polymers" by I. M. Ward.
A- Recommended books and references (scientific journals, reports…).	"Principles of polymer engineering" by C. B. Bucknall.

B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	mechanical behavior o polymers II / **321.MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second semester / third year
6. Number of hours tuition (total)	75
7. Date of production/revision of this specification	20-9-2024
8. Aims of the Course	
1 - Defining the student the effect of the polymer composition and its variables on the mechanical properties.	
2- Acquiring knowledge of the effect of (temperature - time - strain rate - additives) on the mechanical properties of the polymer.	
3- Knowing the effect of directing polymeric molecules on the properties of the polymer.	
4- Acquire knowledge of yield states, types of fracture, and how the behavior of the polymer changes from brittleness to ductility.	
5- Acquire skill in solving problems related to mechanical models and problems of fracture, fatigue and tensile strength in polymers.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals
A1. Thorough knowledge of the viscoelastic behavior of polymers.
A2. Thorough knowledge of deducing equations and models of viscoelastic behavior.
A3. Thorough knowledge of fracture mechanics and the nature of the fracture surface in polymers.
A4. Full knowledge of yield theories in polymers.

B. The skills goals special to the course. B1. Acquisition of skill in the derivations of mechanical models.
B2. Acquiring the skill in solving problems related to various types of fracture.
B3. Gain the skill to solve all the issues that fall within the competence

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1-. Conducting a mini-action research on a problem related to the practical application aspect of polymeric products.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
2-1	6	Understand the close relationship between polymer structure and its mechanical properties with the states of elasticity and viscoelasticity-elasticity in polymers	Effect of polymer structure on its mechanical properties.	lecture	1- Give surprising questions 2- Classroom discussion
4-3	6		The elastic behavior of polymers		
6-5	6		Linear viscoelastic behavior		
8-7	6	Develop mathematical models describing linear viscoelastic behavior with polymer-to-rubber similarity in a given region Learn how the polymer undergoes before failure	Mechanical models of viscoelsticity		
10-9	6		Non-linear viscoelastic behavior		
12-11	6		Rubber-like elasticity		
14-13	6		The yield behavior in polymers		
16-15	6		Yield criteria and cold drawing		
18-17	6	Understanding the theory of fracture in polymers and its types with conditions that transform the behavior of the material from brittleness to ductility	Crazing and shear banding in polymers		
20-19	6		The theory of brittle-ductile transition		
22-21	6		The theory of fracture mechanics		
24-23	6	Understand the effect of molecular orientation, frequency stresses, additives, and other factors on polymer properties	Anisotropic behavior in polymers		
26-25	6		Fatigue in polymers		
28-27	6		Effect of temperature. and strain rate		

30-29	6		Effect of additives on polymer properties		

11. Infrastructure	
1. Books Required reading:	□ Basic texts □ Course Books □ other
2. Main references (sources)	"An Introduction to The mechanical properties of solid polymers" by I. M. Ward.
A- Recommended books and references (scientific journals, reports…).	"Principles of polymer engineering" by C. B. Bucknall.
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Babylon

2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Rheology of polymer II / **324. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second Semester / third stage
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course

The first course aims to introduce students to polymer flow material by identifying its basics related to polymer movement as a solution or as a molten during the examination or manufacturing process. Studying the relationship between the type of movement and its different surrounding conditions, and the type and shape of the effect it will have on the internal structure of the polymer on the shape and arrangement of the internal chains, which in turn directly affects the specifications of the final material and affects the polymer movement during the manufacturing process. Recognizing and predicting the specifications of mechanical, thermal and physical materials through the study of rheological specifications. Benefiting from rheological specifications in numerical studies and designing devices related to polymers. Identifying devices for testing the viscosity and flow rate of polymers and the rest of the rheological specifications.

C- Cognitive goals

The course describes the reactor design and search to the optimum set-up to get higher conversion.

B. The skills goals special to the course. B1. Acquiring the skill in solving problems related to various types of chemical rectors design and their set-up.
B2. Gain the skill to solve all the issues that fall within the competence

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam .
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals C1/ Asking intellectual questions that require effort on the part of the student to reach the final product. C/2 Prepare reports related advanced topics. C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline. C 4 / Encourage correct answers and discuss wrong answers.
D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1-. Conducting a mini-action research on a problem related to the practical application aspect of . Teaching and Learning Methods
J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge. J2- Focus on applications related to daily life to aid learning.
Assessment methods
1- Direct and surprising questions for students. 2- High competition in the classroom among students to motivate them to think more

9· Learning Outcomes, Teaching ,Learning and Assessment Method.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Rheology of polymer	Rheology of polymer in extrusion.	Present Lecture	1- Give surprising questions 2- Classroom discussion
2	4		Extrusion processes types.		
3	4		**Study the rheology numerically .**		
4	4		**Ansys program**		
5	4		**Extrusion power**		
6	4		**Viscoelasticity and Rheology**		
7	4		**Elastic**		

			phenomena		
8	4		**Deborah number**		
9	4		**Experimental equation constants**		
10	4		**Rheology and recycling.**		
11	4		Rheology and surfaces.		
12	4		Rheology and mechanical properties		
13	4		Rheology and thermal properties		
14	4		Rheology and mixing.		
15	4		Rheology and structure.		

1. Books Required reading:	□ Basic texts □ Course Books □ other
2. Main references (sources)	2- Rheological characterization of polymer melts in shear and extension: Measurement reliability and data for practical processing. 3- Johhano Aho, 2011
A- Recommended books and references (scientific journals, reports…).	Rheology and processing of polymeric materials. C.D.Han.
B-Electronic references, Internet sites…	Google scholar

12. The development of the curriculum plan
The course can be developed by looking at modern resources and the Internet.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Paints and Adhesives / **323. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second semester / third year
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1- Learn the principles and basics of adhesives and ways to prepare surfaces for them 2- Learn about adhesion theories 3- Studying the surface factor (the basic theory). 4- Knowing how to prepare plastic surfaces for adhesion 5- Get to know the labels 6-Identification of dyes 7- Studying the mechanical properties of pigments and coating layers 8- Study the basic concepts of the quality of the external appearance of the paint 9- Paint durability test study -10 Understand health and safety requirements in the paint industry	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals
A1- Enabling the student to understand and distinguish between the methods of preparing surfaces for the purposes of gluing and painting.
A2 - Enable the student to understand the mechanisms of action of the surface agent.
A3- Study of physical and chemical methods for surface treatment
A4- Knowledge of excavation processes
A 5- Enable the student to know the types of adhesives, dyes and dye additives
A6 - Enable the student to know the mechanical properties of pigments for layers of paint.
A 7- Enable the student to know the basic concepts of the quality of the external appearance of the paint

B. The skills goals special to the course.
B1 - Prior knowledge of surface treatment and coating technology
B2 - Study of surface coating properties
B3 - Knowledge of the principles of selection and design

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1 - Deduce and predict results

D 2- CV preparation skills

D3- Corporate communication skills

D 4- The skill of preparing the economic feasibility of projects

D5- Skills of providing scientific advice

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 hr	Theories of Adhesion Definition of Failure Modes	Adhesion	lecture	1- Give surprising questions 2- Classroom discussion
2	4hr	Surfactant The Basic Theory Surfactant packing parameter	Surfactants		
3-6	8hr	Physical Methods Corona Discharge, Flame Treatment, Plasma Treatment Chemical Treatments Etching Process	Surface Preparation for Plastics		
7-9	6 hr	Design and selection of adhesive joints Theoretical Analysis of Stresses and Strains Peeling of Adhesive Joints Stiffening Joints Flexible Materials Rigid Plastics	Joint Design		
10-14	10hr	Paint composition and applications Pigments for paint Solvents, thinners, and diluent Oils, Resins, Lacquers, Plasticizers, Driers, Coating process	Paint and Coating process		
15	2hr	Testing and Quality Control	quality control		

		Tests carried out on coatings after they are applied to a substrate Evaluation of physical properties			

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	1. Allen, K. W. (2001). Adhesion and Adhesives. Encyclopedia of Physical science and technics. https://doi.org/10.1179/sic.1984.29.Supplement-1.5 2. Ebnesajjad, S., & Landrock, A. H. (2008). Adhesives Technology Handbook. William Andrew (Vol. 33). 3. Pizzi, A. and K. L. M. (2003). Handbook of A dh esive Tech n o logy. (A. an. K. L. M. Pizzi, Ed.). Copyright ? 2003 by Marcel Dekker, Inc. All Rights Reserved. Neither. 4. R LAMBOURNE and T A STRIVENS "PAINT AND SURFACE COATINGS" Second edition, Woodhead Publishing Ltd,1999. 5. Jan W. Gooch , Analysis and deformulation of Polymeric Materials, Print ©1997 Kluwer Academic / Plenum Publishers New York.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
a- Work in conformity with the existing curricula in international universities b- Follow up on the recent global developments that occur in this sector and reflect that in the lectures	

Course description form

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available learning opportunities. It must be linked to the description of the program.

Course description

University of Babylon	1- Educational Institution
Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries	2- Scientific Department / Center
Non-destructive tests / **322. MEP**	Course name/code -3
weekly	Forms of attendance -4 available
Second semester / third year	Season/year -5
60	Number of hours of study -6 (total(
2024/9/20	The date this description was prepared
	Course objectives
Teaching students the NDT coalition examination for engineering subjects for the purpose of viewing -1Modern methods of coalition examinations of engineering materials -2How to examine practically by all modern examination methods -3Comparing NDT with Destructive Tests	

Course outcomes and methods of teaching, learning and assessment -9
A - knowledge and understanding -1Modern methods of examination -2Types of diagnostic examination methods and identification of defects -3Advantages and disadvantages of each method of examination -4The appropriate method of examination for each composite polymeric material
- 1An acquired skill for every engineer, how to process inspection methods for each material -2The effect of the properties of each polymer on the examination method
Teaching and learning methods

-1The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation.(-2The method of discussion, i.e. (making the student the center of effectiveness instead of teaching.(-3 Publishing electronic lectures on the Babylon University website.
Evaluation methods
-1Classroom discussion during the lecture. -2The sudden exam (cone.(-3Homework -4Monthly exams (number 2) and exams for the final courses.
C- Emotional and moral goals /1Ask intellectual questions that require effort by the student to reach the type of the organic compound. 2/Preparing reports on laboratory experiments and answering their questions. / 3Make the lesson of high importance in terms of lecture time, scientific material and discipline. /4Encouraging correct answers and discussing wrong answers.
Teaching and learning methods
-1Develop all the department's capabilities and human resources to teach and help students to learn and acquire skills and knowledge. -2Focus on applications related to daily life to aid learning.
Evaluation methods
-1Direct and surprising questions for students. -2High competition in the classroom among students to motivate them to think more
d- Transferred general and rehabilitative skills (other skills related to employability and personal development.(-1Conducting a mini-action research on a problem related to the practical application aspect of polymeric products. -2

1. Course Structure

Method of assessment	Method of instruction	name or subject	Required Unit/course	Learning Outcomes	Week Hours
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	**Introduction of IR inspection**	Infrared Spectroscopy Structure Determination Of Organic Compounds Through IR Spectroscopy **IR ABSORPTION BY MOLECULES** Molecular	4hours	2-1

			vibrations		
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	Components Of The Spectrophotometer Major Applications	*Nuclear Magnetic Resonance Spectroscopy* Theory And Principle Shielding And Deshielding	4hours	4-3
-1Give questions Surprise -2 Classroom discussion	**Live lectures**		Mass Spectroscopy	4 hours	6-5
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	INTRODUCTION Diffraction PRINCIPLE BRAGG's EQUATION Peak characteristics in a Diffraction Pattern	Major Applications of X-Ray Diffraction	4hours	8-7

-1Give questions Surprise -2 Classroom discussion	**Live lectures**	Transmission electron microscopy Scanning Electron Microscope Applications	*Electron Microscopy* Types of ELECTRON MICROSCOPE Advantages&Disadvantages	4hours	10-9
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	- • **Thermogravimetric analysis (TGA):** mass • **Differential thermal analysis (DTA):** temperature difference • **Differential scanning calorimetry (DSC):** heat difference • **Dynamic mechanical analysis (DMA) :** mechanical stiffness and damping • **Laser flash analysis (LFA):** thermal diffusivity and thermal conductivity • **Thermomechanical analysis (TMA):** dimension • **Thermo-optical analysis (TOA):** optical	**thermal analysis Types of thermal analysis**	6hours	12 -11

		properties			
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	***TYPES Of ultra sonic test*** **Applications**	**Ultra-sonic inspection**	2hours	14 -13
-1Give questions Surprise -2 Classroom discussion	**Live lectures**	***TYPES OF ELECTRONIC TRANSITIONS*** **Applications**	UV inspection **UV-Visible Spectroscopy**	2hours	16-15

2. Infrastructure	
NDT inspection	-1Required course books
Allied examinations for engineering materials	-2Main references (sources(
	.

-12 course development plan
The course can be developed by looking at modern resources and the Internet

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Mass Transfer / **326. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second semester / third year
6. Number of hours tuition (total)	45
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1- Teaching students the basics of choosing the type of technology according to the nature of the subject	
2-Teaching students the difference between one technology and another	
3-Teaching students mass transfer techniques	

A- Cognitive objectives
A2- Students' knowledge of controlling mass transfer processes to and from CSTR type tanks through mixing raw materials accompanied by chemical reactions and producing new materials
A3- Students' knowledge of controlling processes with two variables in the system in a linear manner Linearization of two variables Systems
A4- Students' knowledge of chemical engineering unit operations

Teaching students methods of mass transfer through several processes in chemical engineering, such as extraction, adsorption, distillation, and evaporation.
9· Learning Outcomes, Teaching, Learning and Assessment Method

A5- Students' learning by responding to distillation operations in refinery petroleum industries.

B- Course-specific skill objectives
B1- Students acquire great skills in using chemical engineering laboratory equipment in inspection processes or working in production

Teaching and Learning Methods

Students are taught in several ways, including:
• Direct theoretical lectures for students via display screens
• Using online learning such as Google Classroom
• Video lectures
• Scientific trips

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	3	Understanding the topic from a scientific and applied perspective		lecture	1- Give surprising questions 2- Classroom discussion
Second	3	Understanding the topic from a scientific and applied perspective	Height of column based on conditions in liquid film		
Third - Sixth	12	Understanding the topic from a scientific and applied perspective	Capacity of tower in terms of partial pressures for high concentrations		
Seventh- Tenth	12	Understanding the topic from a scientific and applied perspective	Plate Towers For Gas Absorption		
Eleventh - Fifteenth	15	Understanding the topic from a scientific and applied perspective	Distillation		
First	3	Understanding the topic from a scientific and applied perspective			
Second	3	Understanding the topic from a scientific and applied perspective	Height of column based on conditions in liquid film		
Third - Sixth	12	Understanding the topic from a scientific and applied perspective	Capacity of tower in terms of partial pressures for high concentrations		
Seventh- Tenth	12	Understanding the topic from a scientific and applied perspective	Plate Towers For Gas Absorption		

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	Chemical Engineering Solutions to the Problems in Chemical Engineering Volumes 2
A- Recommended books and references (scientific journals, reports…).	Chemical Engineering Volume 2, Fifth Edition Process Examples of Parallel System
B-Electronic references, Internet sites…	International Journal of Heat and Mass Transfer. International Journal of Heat and Fluid Flow. International Communications in Heat and Mass Transfer Experimental Thermal and Fluid Science. Previews of Heat and Mass Transfer. Fluid Dynamics Research. Fluid Phase Equilibria. Computers and Fluids
12. The development of the curriculum plan	
a- Work in conformity with the existing curricula in international universities b- Follow up on the recent global developments that occur in this sector and reflect that in the lectures	

Course Description

This course description provides a concise summary of the main features of the course and the learning outcomes expected of the student, demonstrating whether the student has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational Institution	University of Babylon
2. Scientific Department / Center	Department of Polymer Engineering and Petrochemical Industries
3. Course Name / Code	Engineering Analysis / **315. MEP**
4. Available Attendance Forms	Weekly Attendance
5. Semester / Year	First Semester - Third Stage
6. Number of Study Hours	60 Hours

7. Date of Preparation of this Description	20/9/2024
8. Course Objectives	
A- Providing students with the basics of scientific knowledge of numerical analysis and improving their professional abilities towards analytical and creative thinking.	
B- Students' ability to analyze data and identify mathematical methods in formulating and solving problems.	
C- Identifying partial differential equations and learning solution methods. Formulating and solving ordinary differential equations of the first and/or second degree related to engineering applications with examples.	
E- Educational the student with examples with a practical feature.	
F- Students' acquisition of translating engineering knowledge and its theories into practical reality by addressing the problems that the country suffers from in all fields.	

9- Course outcomes, teaching, learning and evaluation methods
A- Cognitive objectives A1- Comprehensive education to understand the impact of engineering solutions globally and economically. A2- Ability to work in multidisciplinary teams. A3- Ability to apply reasoning sciences such as mathematics, pure sciences and engineering. A4- Ability to use modern engineering techniques, skills and tools in the engineering field. A5- Ability to design systems to meet the required needs within realistic constraints from economic aspects. A6- Ability to design and implement experiments, analyze results and translate them realistically.
B - Program specific skill objectives B1 - Use the least teaching methods that are consistent with the students' level and allow students to participate in the discussion. B2 - Use modern and advanced means to take the largest amount of knowledge to the student. B3 - Activate the role of educational guidance in the subject.
C- Demonstrative and benefit goals C1- Ability to make decisions. C2- Methods of modernization among students. C3- Student ability to think. C4- Collecting the data required to complete a specific topic.
Teaching and learning methods
1- Live lectures to students 2- Scientific trips 3-Video lectures
Rates methods

1-Monthly exams
2-End of course exam
3-Surprise written and electronic exams according to Moodle program
4-Homework
5-Class participation
6-Assignment to prepare seminars
7-Subject to the graduation projects discussion committee for fourth-stage students

D - General and modification skills (other skills related to employability and personal development).

1 -Developing and enhancing the student's ability and capacity to use computer programs in the field of specialization.
2 -Developing and enhancing the student's ability to deal with modern technologies specific to the course items.
3 -Developing and enhancing the student's ability to confront problems and find appropriate solutions for them.
4- Developing and enhancing the student's ability to translate academic information into practical reality.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Solving Non-linear Equations (introduction and definitions) + discussion.	Solving Non-linear Equations.	Live lectures	-Class participation -Sudden exams
2	4	Numerical solution of equation one variable location of root, Bisection method , False Position Method+ discussion.	Numerical solution of equation.	Live lectures	-Class participation -Sudden exams -Monthly exam
3	4	Numerical solution of equation one variable location of root Newton-Raphson Method, Secant Method+ discussion.	Numerical solution of equation.	Live lectures	-Class participation -Sudden exams
4	4	Finite difference method for solving differential equations +discussion.	Finite difference method for solving differential equations.	Live lectures	Class participation -Sudden exams -Monthly exam

5	4	Finite difference method for solving differential equations+ discussion.	Finite difference method for solving differential equations.	Live lectures	-Class participation -Sudden exams
6	4	Explicit and implicit methods+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
7	4	Numerical Integration, Trapezoidal Rule+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
8	4	The Multiple Application Trapezoidal Rule+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
9	4	Numerical methods for solving integration: Simpsons 1/3 rule , Simpsons 3/8 rule+ discussion.	Numerical methods for solving integration Simpsons rule.	Live lectures	-Class participation -Sudden exams
10	4	Numerical method for solving ordinary differential equations+ discussion.	Numerical method for solving ordinary differential equations.	Live lectures	-Class participation -Sudden exams
11	4	Euler method, Runge-Kutta 2nd Order Method + discussion.	Euler method, Runge-Kutta 2nd Order Method.	Live lectures	-Class participation -Sudden exams
12	4	Runge-Kutta 4th Order Method+ discussion.	Runge-Kutta 4th Order Method.	Live lectures	-Class participation -Sudden exams
13	4	Determinants and Matrices, Direct Methods to solve Linear Equations Systems, Gaussian elimination Method. + discussion.	Determinants and Matrices.	Live lectures	-Class participation -Sudden exams
14	4	Gauss-Jordan elimination Method+ discussion.	Gauss-Jordan elimination Method.	Live lectures	-Class participation -Sudden exams

15	4	Indirect Methods to solve Linear Equations Systems, Jacobi Method. The Gauss-Seidel Method+ discussion.	Indirect Methods to solve Linear Equations.	Live lectures	-Class participation -Sudden exams

11- Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily, oral, monthly and written exams, reports, etc.	
12- Infrastructure, learning and teaching resources	
Required textbooks	Advanced engineering mathematics" by C. R. WYLIE, JR. ,third edition 1966
Main references (sources)	1-Advanced engineering mathematics Erwin Kreyszig in Collaboration With Herbert. 2-Dennis G. Zill, Loyola Marymount University. Sixth edition
Recommended supporting books and references (scientific journals, reports, etc.)	- https://link.springer.com/
Electronic references, Internet sites	https://math.libretexts.org/Courses/Monroe_Community_College/MTH_225_Differential_Equations/8%3A_Laplace_Transforms/8.4%3A_The_Unit_Step_Function-
13- Course Development Plan	
1-Matching with the course of international universities. 2- Following up on the latest global developments in this sector and reflecting that in the lectures.	

Course Description

This course description provides a concise summary of the main features of the course and the learning outcomes expected of the student, demonstrating whether the student has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational Institution	University of Babylon
2. Scientific Department / Center	Department of Polymer Engineering and Petrochemical Industries

3. Course Name/ Code	numerical Analysis / **325. MEP**
4. Available Attendance Forms	Weekly Attendance
5. Semester / Year	Second Semester - Third Stage
6. Number of Study Hours	60 Hours
7. Date of Preparation of this Description	20/9/2024
8. Course Objectives	
A- Providing students with the basics of scientific knowledge of numerical analysis and improving their professional abilities towards analytical and creative thinking.	
B- Students' ability to analyze data and identify mathematical methods in formulating and solving problems.	
C- Identifying partial differential equations and learning solution methods. Formulating and solving ordinary differential equations of the first and/or second degree related to engineering applications with examples.	
E- Educational the student with examples with a practical feature.	
F- Students' acquisition of translating engineering knowledge and its theories into practical reality by addressing the problems that the country suffers from in all fields.	

9- Course outcomes, teaching, learning and evaluation methods
A- Cognitive objectives A1- Comprehensive education to understand the impact of engineering solutions globally and economically. A2- Ability to work in multidisciplinary teams. A3- Ability to apply reasoning sciences such as mathematics, pure sciences and engineering. A4- Ability to use modern engineering techniques, skills and tools in the engineering field. A5- Ability to design systems to meet the required needs within realistic constraints from economic aspects. A6- Ability to design and implement experiments, analyze results and translate them realistically.
B - Program specific skill objectives B1 - Use the least teaching methods that are consistent with the students' level and allow students to participate in the discussion. B2 - Use modern and advanced means to take the largest amount of knowledge to the student. B3 - Activate the role of educational guidance in the subject.
C- Demonstrative and benefit goals C1- Ability to make decisions. C2- Methods of modernization among students. C3- Student ability to think. C4- Collecting the data required to complete a specific topic.
Teaching and learning methods

1- Live lectures to students
2- Scientific trips
3-Video lectures

Rates methods

1-Monthly exams
2-End of course exam
3-Surprise written and electronic exams according to Moodle program
4-Homework
5-Class participation
6-Assignment to prepare seminars
7-Subject to the graduation projects discussion committee for fourth-stage students

D - General and modification skills (other skills related to employability and personal development).

1 -Developing and enhancing the student's ability and capacity to use computer programs in the field of specialization.
2 -Developing and enhancing the student's ability to deal with modern technologies specific to the course items.
3 -Developing and enhancing the student's ability to confront problems and find appropriate solutions for them.
4- Developing and enhancing the student's ability to translate academic information into practical reality.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Solving Non-linear Equations (introduction and definitions) + discussion.	Solving Non-linear Equations.	Live lectures	-Class participation -Sudden exams
2	4	Numerical solution of equation one variable location of root, Bisection method , False Position Method+ discussion.	Numerical solution of equation.	Live lectures	-Class participation -Sudden exams -Monthly exam
3	4	Numerical solution of equation one variable location of root Newton-Raphson Method, Secant Method+ discussion.	Numerical solution of equation.	Live lectures	-Class participation -Sudden exams

4	4	Finite difference method for solving differential equations +discussion.	Finite difference method for solving differential equations.	Live lectures	Class participation -Sudden exams -Monthly exam
5	4	Finite difference method for solving differential equations+ discussion.	Finite difference method for solving differential equations.	Live lectures	-Class participation -Sudden exams
6	4	Explicit and implicit methods+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
7	4	Numerical Integration, Trapezoidal Rule+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
8	4	The Multiple Application Trapezoidal Rule+ discussion.	Numerical Integration.	Live lectures	-Class participation -Sudden exams
9	4	Numerical methods for solving integration: Simpsons 1/3 rule , Simpsons 3/8 rule+ discussion.	Numerical methods for solving integration Simpsons rule.	Live lectures	-Class participation -Sudden exams
10	4	Numerical method for solving ordinary differential equations+ discussion.	Numerical method for solving ordinary differential equations.	Live lectures	-Class participation -Sudden exams
11	4	Euler method, Runge-Kutta 2nd Order Method + discussion.	Euler method, Runge-Kutta 2nd Order Method.	Live lectures	-Class participation -Sudden exams
12	4	Runge-Kutta 4th Order Method+ discussion.	Runge-Kutta 4th Order Method.	Live lectures	-Class participation -Sudden exams

13	4	Determinants and Matrices, Direct Methods to solve Linear Equations Systems, Gaussian elimination Method. + discussion.	Determinants and Matrices.	Live lectures	-Class participation -Sudden exams
14	4	Gauss-Jordan elimination Method+ discussion.	Gauss-Jordan elimination Method.	Live lectures	-Class participation -Sudden exams
15	4	Indirect Methods to solve Linear Equations Systems, Jacobi Method. The Gauss-Seidel Method+ discussion.	Indirect Methods to solve Linear Equations.	Live lectures	-Class participation -Sudden exams
15	4	Indirect Methods to solve Linear Equations Systems, Jacobi Method. The Gauss-Seidel Method+ discussion.	Indirect Methods to solve Linear Equations.	Live lectures	-Class participation -Sudden exams

11- Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily, oral, monthly and written exams, reports, etc.	
12- Infrastructure, learning and teaching resources	
Required textbooks	Advanced engineering mathematics" by C. R. WYLIE, JR. ,third edition 1966
Main references (sources)	1-Advanced engineering mathematics Erwin Kreyszig in Collaboration With Herbert. 2-Dennis G. Zill, Loyola Marymount University. Sixth edition
Recommended supporting books and references (scientific journals, reports, etc.)	- https://link.springer.com/
Electronic references, Internet sites	https://math.libretexts.org/Courses/Monroe_Community_College/MTH_225_Differential_Equations/8%3A_Laplace_Transforms/8.4%3A_The_Unit_Step_Function-
13- Course Development Plan	
1-Matching with the course of international universities. 2- Following up on the latest global developments in this sector and reflecting that in the lectures.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Babylon University /Collage of Material Engineering
2. University Department/Centre	Polymer and petrochemical industries
3. Course title/code	biopolymers /**319. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	First Semester/third year
6. Number of hours tuition (total)	45
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course
1-Knowledge of types of biomaterials and their uses
2-study classification and requirement of biomaterials biocompatibility ,manufacturability and sterilizablity
3- Studying the performance properties of life materials and the probability of failure
4- Studying ways to improve the surfaces of living materials and prevent the occurrence of clots
5- Studying the mechanical properties of life materials
6- Study of all kinds of biomaterials, ceramic and polymeric minerals, and study of all their properties
8- A study of the basics of life polymers and the types of natural and synthetic biopolymers
9- Acquire knowledge of the stability of life polymers 10- By studying biodegradable industrial polymers and non-degradable industrial polymers 11- Study of biocomposite materials with a polymer basis, their properties and applications

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals A1- Full knowledge of the types of life materials A2- Full knowledge of the performance properties of life materials and the possibility of failure A3- Full knowledge of the mechanical properties of living materials A4- Full knowledge of the types and properties of life polymers A 5- Full knowledge of the stability of these life polymers A6- Full knowledge of polymer-based composite materials and their applications
B. The skills goals special to the course. B1 - Acquisition of the skill of identifying types of life materials B2 - Acquire the skill of determining the type of biopolymer suitable for a biological application B3 - Acquiring the skill of knowing the forms of failure that occur in life polymers B 4- Acquiring the skill of manufacturing and dealing with these polymers before placing them inside the human body by sterilizing them and knowing their biocompatibility with surrounding tissues and with the body as a whole.

Teaching and Learning Methods
1- Giving theoretical lectures 2- Electronic lectures with scientific films showing 3- Assigning students to prepare lectures and deliver them to their colleagues (Sumner).
Assessment methods
1-Monthly and final exams 2- Evaluation of research and seminars 3-Evaluation of the student through his daily activities during the lecture 4- Sudden Exam (Cuz).
C. Affective and value goals C1/ Asking intellectual questions that require effort on the part of the student to reach the final product. C/2 Prepare reports on laboratory experiments and answer their questions. C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline. C 4 / Encourage correct answers and discuss wrong answers.
Teaching and Learning Methods
1-Method of delivering lectures directly to students 2- Students participate in preparing reports, research and seminars
Assessment methods
1-Monthly and final exams 2- High competition in the classroom among students to motivate them to think more 3-Evaluation of the student through his daily activities during the lecture

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1- Conducting a small research on biopolymers D 2- Homework

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	10	Knowing the types of biomaterials and their uses, studying the classification of life materials, studying their compatibility requirements, sterilization, manufacturing and functionality, and studying the performance properties of biomaterials and the probability of failure.	**Biomaterial, Uses of Biomaterials,Classification of Biomaterials, Requirements of Biomaterials, Biocompatibility, Sterilizability, Functionability, Manufacturability Performance of Biomaterials, Surface Modifications for Improving Biocompatability, Mechanical Properties of Biomaterials, Metallic Biomaterials types and properties Ceramic biomaterials types and properties**	DIRECT lectures	Class participation and surprise exams
4-8	10	- Study of the basics of life polymers and types of life polymers, natural and synthetic - or a study of the stability of life polymers	Biopolymer Basics, Classification of Polymers, Polymer Stability, Naturally Occurring Polymer Biomaterials, General Introduction to Proteins, Collagen, Alginate, Alginate uses, Alginate Applications, Chitin and Chitosan, Chitosan Properties: -Biocompatibility, Uses of Chitosan		

9-10	10	biodegradable	**SyntheticBiodegradable Polymers,PLA**		
HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW					
D 2- Homework					
		that are not biodegradable	Polymers, **Polyethylene:, High Density Polyethylene, Ultrahigh Molecular Weight Polyethylene,**		

11. Infrastructure	
1. Books Required reading:	Polymeric Biomaterials Main texts: Live lectures
2. Main references (sources)	Biomaterials - Principles and Applications
A- Recommended books and references (scientific journals, reports…).	Introduction to Biomaterials
B-Electronic references, Internet sites…	Functional Materials and Biomaterials
12. The development of the curriculum plan	
View the latest developments in research and e-books in the field of biomaterials and polymers via the Internet	

TEMPLATE FOR COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

COURSE SPECIFICATION

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	English Language I
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly, 1st semester - Stage Three
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
A - Read and understand simple texts and a range of high frequency vocabulary in context.	
B - Talk about aspects of personal and daily life.	
C - Write sentences and paragraphs of familiar topics.	
D - Enable the student to listen, write and speak.	
E - Enable the student to gain the necessary experience and skills by presenting topics in English.	

9· Learning Outcomes, Teaching, Learning and Assessment Methode

A- Cognitive goals
A1- This course is designed to enhance learners' four language skills through a variety of activities;
A2 - Reading texts, discussion,
A3 - Practicing grammar, listening,
A4 - Speaking using every day English, building vocabulary.

B- The skills goals special to the course. B1- By performing these activities, students can achieve an advanced level of English in general. B2- And develop some basic social language functions. B3- Know the basics of speaking. B4- Scientific writing.
Teaching and Learning Methods
1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation). 2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching). 3- Publishing electronic lectures on the Babylon University website.
Assessment methods
1- Classroom discussion during the lecture. 2- The sudden exam (cone). 3- Homework 4- Monthly exams (number 2) and exams for the final courses.
C. Affective and value goals C1/ Asking intellectual questions that require effort on the part of the student to reach the final product. C/2 Prepare reports on speaking experience and answer their questions. C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline. C 4 / Encourage correct answers and discuss wrong answers.
Teaching and Learning Methods
J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge. J2- Focus on applications related to daily life to aid learning.
Assessment methods
1- Direct and surprising questions for students. 2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development).

D1 - Deduce and predict results
D 2- CV preparation skills
D3- Corporate communication skills
D4- Skills of providing scientific advice.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 hr	English Sentence Structure	English Grammar and Engineering Technical Vocabulary	Lecture	1- Give surprising questions 2- Classroom discussion
2-3	4hr	Present Perfect AND Present Perfect Continuous Tense	English Grammar and Engineering Technical Vocabulary		
4-5	4hr	- Vocabulary, In the kitchen food. - Reading Unit, It's a nightmare! +Terms	English Grammar and Engineering Technical Vocabulary		
6	2 hr	- Past Tense, Simple past. - Reading Unit, Laughter is the best medicine.	English Grammar and Engineering Technical Vocabulary		
7-8	4hr	- Past Tense; (Past Perfect and Past Perfect Continuous Tenses) - Vocabulary, Traveling	English Grammar and Engineering Technical Vocabulary		
9-10	4hr	- Future Tense; (simple future and future Continuous Tenses) - (used to) and (have to) phrase.	English Grammar and Engineering Technical Vocabulary		
11-12	4hr	- Future Tense; (Future Perfect and Future Perfect Continuous) - Writing section: use **but** & **and**	English Grammar and Engineering Technical Vocabulary		
13-14	4hr	- The Position of the Adverb - Reading Unit,	English Grammar and Engineering Technical		

		Happy Birthday	Vocabulary		
15	2 hr	- Types of Home, Houses, - Reading Unit, The Secrets of Luck	English Grammar and Engineering Technical Vocabulary		

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	1- https://books.google.ru/books/about/Face2face_Intermediate_Student_s_Book_wi.html?id=qi21ngEACAAJ&redir_esc=y 2- Liz and Soars, J. (2014) New Headway-Pre-intermediate. Oxford: Oxford University Press. www.oup.com/elt/headway. 3- Quirk,R.;S.Greenbaum; G. Leech; and J. Svartrik. (1985). A Comprehensive Grammar of the English Language. London: Longman. 4- Raymond Murphy, English Grammar in Use, Second Edition, Cambridge. University Press. 5- Quirk, R. and S. Greenbaum. (1973). A Concise Grammar of Contemporary English. London: Harcourt brace Jovanovich, Inc.
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
a- Work in conformity with the existing curricula in international universities b- Follow up on the recent global developments that occur in this sector and reflect that in the lectures	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	English Language II
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly, 2nd semester - Stage Three
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
A - Read and understand simple texts and a range of high frequency vocabulary in context.	
B - Talk about aspects of personal and daily life.	
C - Write sentences and paragraphs of familiar topics.	
D - Enable the student to listen, write and speak.	
E - Enable the student to gain the necessary experience and skills by presenting topics in English.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals
A1- This course is designed to enhance learners' four language skills through a variety of activities;
A2 - Reading texts, discussion,
A3 - Practicing grammar, listening,
A4 - Speaking using everyday English, building vocabulary.

B- The skills goals special to the course. B1- By performing these activities, students can achieve an advanced level of English in general.
B2- And develop some basic social language functions.
B3- Know the basics of speaking.
B4- Scientific writing.

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2- The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on speaking experience and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development).

D1 - Deduce and predict results
D 2- CV preparation skills
D3- Corporate communication skills
D4- Skills of providing scientific advice.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 hr	The Simple Present Tense	English Grammar and Engineering Technical Vocabulary	lecture	1- Give surprising questions 2- Classroom discussion
2-3	4hr	Techniques used to study and characterize surfaces	surface characterization techniques		
4-5	4hr	Study of surface tension, contact angle and wettability	Surface tension and its measurements		
6	2 hr	Study of mechanical properties of polymeric surfaces	mechanical state of the surface		
7-8	4hr	Study the properties of friction and modulus friction for polymers	Friction and coefficient of friction for polymers		
9-10	4hr	Study of the types of wear of polymeric surfaces	Wear		
11-12	4hr	Lubrication Techniques Study	Lubrication		
13-14	4hr	Study of coating techniques and mechanical properties of coatings	Coatings		
15	2 hr	The study of the properties of Surfactants	Surfactants		

11. Infrastructure

1. Books Required reading:	

2. Main references (sources)	1. Jamal Takadoum “Materials and Surface Engineering in Tribology.” John Wiley & Sons, Inc, USA, 2008. 2.Zhikang Xu, Xiaojun Huang, Lingshu Wan, “Surface Engineering of Polymer Membranes ", Zhejiang University Press, Hangzhou and Springer-Verlag GmbH Berlin Heidelberg.(2009) , 3.Manfred Stamm, “Polymer Surfaces and Interfaces ", First edition, Springer-Verlag Berlin Heidelberg.(2008) 4.Kenneth Holmberg and Allan Matthews, “COATINGS TRIBOLOGY”, Second Edition, 2009 . 5.Wypych, George, “Handbook of antiblocking, release, and slip additives ", ChemTec Publishing, 2005

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Babylon University/ College of Material Engineering
2. University Department/Centre	Polymer and Petrochemical Industries Department
3. Course title/code	Technology of Composite Materials/ **411.MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Second semester / fourth stage
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course
Teaching students the technology of composite materials for the purpose of learning about
1- Modern methods of manufacturing polymeric composite materials and methods of molding them
2- How to operate the composite polymeric products and clarify a method for each product
3- Comparison of forming and molding methods for each type of polymeric materials
9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A- knowledge and understanding

A1 - Forming methods and molding methods

A2-Types of molding methods

A3- The benefits and harms of each method of molding

A4- The appropriate molding method for each composite polymeric material

B. The skills goals special to the course.

B1 - A skill acquired by every engineer, how to handle molding methods for each material

B2 - Effect of the properties of each polymer on the molding method

B3 - Effect of additives that determine the molding method

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the
2- introduction and the prelude to the lesson, the presentation of the material as a
3- coherent sequential presentation).
4- 2- The method of discussion, i.e. (making the student the center of effectiveness
5- instead of teaching).
6- 3- Publishing electronic lectures on the Babylon University website.

Assessment methods

1- Classroom discussion during the lecture.

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C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.

C/2 Prepare reports on laboratory experiments and answer their questions.

C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.

C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.

J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.

2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1. class participation. D2. Quiz. D3. stimulation of participation of class. D4.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	4		**Introduction of composite materials** **-Composites Manufacturing Processes- Basic Steps in a Composites Manufacturing Process**	lecture	1- Give surprising questions 2- Classroom discussion
3-4	4		**Manufacturing Processes for Thermoset Composites** **Lay-Up Process - Prepreg Lay-Up Process** **Wet Lay-Up Process**	lecture	- Give surprising questions 2- Classroom discussion
5-6	4		**Spray-Up Process** **Filament Winding Process** **- Pultrusion Process** **--Resin Transfer Molding Process**	lecture	- Give surprising questions 2- Classroom discussion
7-8	4		**- Structural Reaction Injection Molding (SRIM) Process**	lecture	- Give surprising questions 2- Classroom discussion

			- Injection Molding of Thermoset Composites **- Compression Molding Process**		
9-10	4		**Manufacturing Processes for Thermoplastic Composites** **-Thermoplastic Tape Winding** **- Thermoplastic Pultrusion Process** **- Compression Molding of GMT**	lecture	- Give surprising questions 2- Classroom discussion
11-12	4		**-Hot Press Technique** **Autoclave Processing** **-Diaphragm Forming Process** **Injection Molding-**	lecture	- Give surprising questions 2- Classroom discussion
13-14	4		**Reinforcement and matrix bonding** **The Mechanism of Adhesion**	lecture	- Give surprising questions 2- Classroom discussion
15-16	4		***Joining of Composite Materials*** **Machining and Cutting of Composites**	lecture	- Give surprising questions 2- Classroom discussion

11. Infrastructure	
1. Books Required reading:	Basic Texts Course book
2. Main references (sources)	Sanjay K. Mazumdar, Ph.D."COMPOSITES MANUFACTURING, Materials, Product,and Process Engineering " F. C. Campbell," Manufacturing Processes For Advanced Composites "

A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Google Scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Process Control II / **416. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly second semester/ third stage
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course
A - Enabling students to apply Laplace’s mathematical equations in control systems for chemical engineering processes, such as controlling the level of liquid rise in fuel tanks or tanks for supplying factories with basic materials and controlling the transfer of temperature and mass, especially in CSTR tanks.
B - Controlling flow processes to and from connected and non-interaction tanks. Interaction and non-interaction systems
C- Controlling mass transfer processes to and from CSTR-type tanks through mixing processes of raw materials, which are accompanied by chemical reactions and the production of new materials.
D - Managing mass transfer processes in CSTR-type tanks through the mixing of raw materials, along with accompanying chemical reactions that produce new materials.
E-Use SECOND-ORDER SYSTEMS

A- Cognitive objectives
A1- Students' knowledge of controlling flow processes to and from connected and non-connected tanks Interaction and non-Interaction systems
A2- Students' knowledge of controlling mass transfer processes to and from CSTR type tanks through mixing raw materials accompanied by chemical reactions and producing new materials

9· Learning Outcomes, Teaching, Learning and Assessment Method

A3- Students' knowledge of controlling processes with two variables in the system in a linear manner Linearization of two variables Systems
A4- Students' knowledge of using the SECOND-ORDER SYSTEMS
A5- Students' learning by responding to the SECOND-ORDER SYSTEMS

B- Course-specific skill objectives
B1- Students acquire great skills in using laboratory equipment in inspection processes or working in production
B2- Students acquire great skills in controlling factories' final products according to the specified specifications

Teaching and Learning Methods

Students are taught in several ways, including:
• Direct theoretical lectures for students via display screens
• Using online learning such as Google Classroom
• Video lectures
• Scientific trips

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	2	Understanding the topic from a scientific and applied perspective	Physical examples of first-order system	lecture	1- Give surprising questions 2- Classroom discussion
Second	2	Understanding the topic from a scientific and applied perspective	Response of 1st order systems in series		
Third - Sixth	8	Understanding the topic from a scientific and applied perspective	Interaction and non-interaction systems		
Seventh-Tenth	8	Understanding the topic from a scientific and applied perspective	Linearization of two variables Systems		
Eleventh - Fifteenth	10	Understanding the topic from a scientific and applied perspective	Physical examples of first-order system		

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	Chemical Process - Dynamics and Controls, Transfer Function Models, The Process Control Loop Controllers, Types of control
A- Recommended books and references (scientific journals, reports…).	International Journal of Air-Conditioning and Refrigeration Proceedings - IEEE International Conference on Robotics and Automation Minerals Engineering
B-Electronic references, Internet sites…	Google Scholar,https://controls.engin.umich.edu
12. The development of the curriculum plan	
a- Work in conformity with the existing curricula in international universities b- Follow up on the recent global developments that occur in this sector and reflect that in the lectures	

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Course Description Form

1. Course Name: Process Control-1
2. Course Code: **416 MEP.**
3. Semester / Year: First semester; Fourth stage
4. Description Preparation Date: 20/9/2024
5. Available Attendance Forms: Students receive theoretical lectures, practical and applied lectures, and attendance is weekly
6. Number of Credit Hours (Total) / Number of Units (Total) :30 hours/ 30 units
7. Course administrator's name (mention all, if more than one name)

Name: Dr.Salih Abbas Habeeb
Email: drsaleh.abbas@uobabylon.edu.iq

8. Course Objectives

Course Objectives	• Teaching students what control processes are and how chemical engineering processes are controlled, such as cooling and heating processes, fluid flow, and mass transfer processes. • Students' knowledge of basic terms in control processes • The difference between an open and closed control system • Illustrate examples of control processes that serve our daily lives • Enabling students to apply Laplace's mathematical equations in control systems for chemical engineering processes, such as controlling the level of liquid rise in fuel tanks or tanks for supplying factories with basic materials and controlling the transfer of temperature and mass, especially in CSTR tanks.

9. Teaching and Learning Strategies

Strategy	Graduating students acquire high skills in working as a production engineer or an engineer working in quality control of the final product in all factories that are subject to control processes in chemical engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Understanding the topic from a scientific and applied perspective	**Introduction to process control**	Direct lecture to students	Surprise exams
Second	2	Understanding the topic from a scientific and applied perspective	**Basic Concepts of Process Control Technology**	Direct lecture to students	Surprise exams
Third - Sixth	8	Understanding the topic from a scientific and applied perspective	**Dynamic analysis and time response**	Direct lecture to students	Surprise and monthly exams
Seventh-Tenth	8	Understanding the topic from a scientific and applied perspective	**Applying the Laplace Transform to the Tank Filling System**	Direct lecture to students	Surprise and monthly exams
Eleventh - Fifteenth	10	Understanding the topic from a scientific and applied perspective	**Development of Transfer Faction for first order system**	Direct lecture to students	Surprise and monthly exams, preparation of seminars, and a final exam

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This description provides a significant summary of the most important characteristics of the Rapporteur and the expected learning outcomes of the student to achieve us from whether they have achieved maximum benefits from available learning opportunities. The program description must be linked

1. Teaching Institution	University of Babylon/College of Materials Engineering
2. University Department/Centre	Polymer engineering and petrochemical industries
3. Course title/code	Quality control engineering / **414. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly –second semester/fourth stage
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1- 1. Monitoring the raw materials to ensure their conformity with the set specifications. 2- 2. Acquisition of scientific skill in controlling various industrial processes for the purpose of adhering to specifications such as size, weight, length, installation ... etc. 3- 3. The student's dependence on scientific skills and their support for the practical side for the purpose of controlling finished products to ensure their efficiency 4. Enabling the student to access as many defects as possible for the manufactured products, but in all cases the amount of defect or damage cannot be equal to zero due to the nature of the labor, machinery and raw materials used.	

9. Learning Outcomes, Teaching ,Learning and Assessment Methode
A1- Enabling the student to understand and distinguish between the raw, intermediate and final materials for these industries, since the quality control starts from the entry or start of receiving the raw materials or other semi-manufactured parts that are considered among the requirements of the production process A2 - Enable the student to know how to store raw materials and their uses in transformational and production processes according to their logical sequence and the need for these materials from stores, then examine the produced goods after they leave the production processes A3- Studying the qualitative control methods for displaying the production of industrial, manufacturing and electronic products.....etc. A4- Study important manufacturing processes
1- Knowledge of quality control and its types. 2- Knowing the methods and methods of measuring quality according to the nature of the variables and properties. 3- Forming knowledge in the priorities of quality systems, sampling and their relationship to distributions Applied knowledge of quality control methods
Teaching and Learning Methods

1- Online lectures directly to students
2- Seminars and research

Teaching and Learning Methods

1- Monthly exam number 2 + final exam
2- Surprise exams
3- Class participation
4- Evaluation of seminars and homework

B. Affective and value goals

C1.enourage the students on innovations and create sedulity spirit and abnegation of themselves through continuous encouragement on necessity of shared cooperation among them in order to perform their studying requirements.
C2. Supplying the students with electronic site from university which related with availability of future chances for appointing and employment.
C3. Acquire the students with knowledge to the importance of their capabilities development through self-culturing by peruse of various knowledge.

Assessment methods

1- 1- class post
2- 2- Mid exams
3- 3- Monthly and final exams
4- 4- Evaluation of seminars and research

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
1. Verbal communication (the ability to express thinking clearly and confidently in speech)
2- Teamwork (working with confidence within the group)
3- Analysis and investigation (collecting information systematically and scientifically to establish facts and principles to solve problems
4- Initiative (identifying opportunities and developing ideas and solutions)
5- Written communication (the ability to express yourself clearly in writing)
6- Planning and Organizing (the ability to plan and implement activities effectively)
7- Flexibility (successfully adapting to changing situations)
8. Effective time management, prioritizing tasks and being able to work on deadlines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	**2 hr**	**Detailed Design**	**Detailed Steps for Product Design, Translate Specification Product, Raw Material Tests**	Lectures directly	Classroom Give surprising questions
2	**2 hr**	**Understanding**	**Understanding the Need for Detailed Design**	Lectures directly	

3	**2 hr**	**Optimization Process**	**Benefits of an Optimized Process for Detailed Design**	Lectures directly	
4	**2 hr**	**product design**	**Detailed steps for the product design**	Lectures directly	
5	**2 hr**	**Translate Specification**	**Detailed Steps for Translate Specification Product**	Lectures directly	
6	**2 hr**	**implementing QFD**	**The main goals in implementing QFD**	Lectures directly	
7	**2 hr**	**Raw material testing**	**Raw material testing and quality control**	Lectures directly	
8	**2 hr**	**Material Behavior**	**Material Behavior Assumptions**	Lectures directly	
9	**2 hr**	**Fuzzy logic**	**Fuzzy logic and Quality Control charts**	Lectures directly	
10-11	**4 hr**	**capability index (CP)**	**capability index (CP)**	Lectures directly	
12	**2 hr**	**Redesign of Quality Control Engineering**	**Histogram Engineering (Redesign of Quality Control Engineering**	Lectures directly	
13	**2 hr**	**Probability distributions**	**Acceptance sampling and process control** and **Probability distributions**	Lectures directly	
14-15	**4 hr**	**Probability** distributions	**Probability theory Engineering process**	Lectures directly	

11. Infrastructure

1. Books Required reading:	***1. Engineering Optimization: Theory and Practical*** ***2. Statistical Quality Control***
2. Main references (sources)	***Quality control Engineers Handbook.***
A- Recommended books and references (scientific journals, reports…).	***Engineering Optimization: Theory and Practical***
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This description provides a significant summary of the most important characteristics of the Rapporteur and the expected learning outcomes of the student to achieve us from whether they have achieved maximum benefits from available learning opportunities. The program description must be linked

1. Teaching Institution	University of Babylon/College of Materials Engineering
2. University Department/Centre	Polymer engineering and petrochemical industries
3. Course title/code	Industrial engineering / **414. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly- first semester / fourth stage
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1- 1. Monitoring the raw materials to ensure their conformity with the set specifications. 2- 2. Acquisition of scientific skill in controlling various industrial processes for the purpose of adhering to specifications such as size, weight, length, installation ... etc.	

3- 3. The student’s dependence on scientific skills and their support for the practical side for the purpose of controlling finished products to ensure their efficiency
4. Enabling the student to access as many defects as possible for the manufactured products, but in all cases the amount of defect or damage cannot be equal to zero due to the nature of the labor, machinery and raw materials used.

9. Learning Outcomes, Teaching ,Learning and Assessment Methode
A1- Enabling the student to understand and distinguish between the raw, intermediate and final materials for these industries, since the industrial engineering starts from the entry or start of receiving the raw materials or other semi-manufactured parts that are considered among the requirements of the production process A2 - Enable the student to know how to store raw materials and their uses in transformational and production processes according to their logical sequence and the need for these materials from stores, then examine the produced goods after they leave the production processes A3- Studying the qualitative control methods for displaying the production of industrial, manufacturing and electronic products.....etc. A4- Study important manufacturing processes
1- Knowledge of quality control and its types. 2- Knowing the methods and methods of measuring quality according to the nature of the variables and properties. 3- Forming knowledge in the priorities of quality systems, sampling and their relationship to distributions Applied knowledge of industrial engineering methods
Teaching and Learning Methods
1- Online lectures directly to students 2- Seminars and research
Teaching and Learning Methods
1- Monthly exam number 2 + final exam 2- Surprise exams 3- Class participation 4- Evaluation of seminars and homework
C. Affective and value goals C1. Learning Outcomes Using Bloom's Taxonomy for the Affective Domain Levels of Learning Outcomes (Competence) Skills Demonstrated receiving Awareness, willingness to hear, selected attention. Examples: Listen to others with respect. Listen for and remember the name of newly introduced people C2. Affective objectives are designed to change an individual's attitude, choices, and relationships. C3. The differentiate, to accept, to listen (for), to respond to. Responding is committed in some small measure to the ideas, materials, or phenomena involved by actively responding to them. Examples are: to comply with, to follow, to commend, to volunteer, to spend leisure time in, to acclaim. C4.
Assessment methods
5- 1- class post 6- 2- Mid exams 7- 3- Monthly and final exams

8- 4- Evaluation of seminars and research

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
1. Verbal communication (the ability to express thinking clearly and confidently in speech)
2- Teamwork (working with confidence within the group)
3- Analysis and investigation (collecting information systematically and scientifically to establish facts and principles to solve problems
4- Initiative (identifying opportunities and developing ideas and solutions)
5- Written communication (the ability to express yourself clearly in writing)
6- Planning and Organizing (the ability to plan and implement activities effectively)
7- Flexibility (successfully adapting to changing situations)
8. Effective time management, prioritizing tasks and being able to work on deadlines

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	**2 hr**	Concepts and importance industrial engineering	Introduction to Industrial Engineering	Lectures directly	Classroom Give surprising questions
2	**2 hr**	**Analysis, *Post*-Production Analysis**	Plant layout, Pre-Production Analysis, *Post*-Production Analysis, Steps cost Calculation	Lectures directly	
3	**2 hr**	**Detailed design , translate of spe**cification product and raw materials tests	Detailed steps for product design, Translate Specification Product, Raw Material Tests	Lectures directly	
4	**2 hr**	**product design**	**Detailed steps for the product design**	Lectures directly	
5	**2 hr**	**Translate Specification**	**Detailed Steps for Translate Specification Product**	Lectures directly	
6	**2 hr**	Linear Programming, ,	Linear Programming, Maintenance	Lectures directly	
7	**2 hr**	**Modeling**	**Neural Networks, Fuzzy Systems,**	Lectures directly	
8	**2 hr**	**Probability and**	**Distribution Methods**	Lectures directly	

		distributions			
9	**2 hr**	**Reliability engineering**	**Forecasting, Reliability Theory**	Lectures directly	
10-11	**2 hr**	**Modeling**	**Operation research engineering**	Lectures directly	
12	**2 hr**	**Mathematical models**	**Transportation Models,**	Lectures directly	
13	**2 hr**	**Choose of the machines**	**Choose the machines and tools, Operations Sequence**	Lectures directly	
14-15	**2 hr**	**Genetic Algorithms**	**Sustainability , Genetic Algorithms**	Lectures directly	

11. Infrastructure	
1. Books Required reading:	***1. Engineering Optimization: Theory and Practical*** ***2. Statistical Quality Control*** Industrial Engineering
2. Main references (sources)	Kjell, B. Zandin, Industrial Engineering, Handbook , McGraw-Hill Stanndard Handbooks,
A- Recommended books and references (scientific journals, reports…).	***Singiresu S. Rao , Engineering Optimization: Theory and Practical, July 20, 2009***
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Babylon University/ College of Material Engineering
2. University Department/Centre	Polymer and Petrochemical Industries Department
3. Course title/code	rubber engineering / **414. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	First semester/ fourth stage
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
Knowledge of rubber composition	
Knowledge of the types of synthetic rubber and its chemical composition	
Learn about the mixing and compounding process.	
Learn about the vulcanization process and its types	
Identify the most important rubber production processes	
Identify the most important physical and mechanical tests	
Knowledge of rubber composition	

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals .

A1. A1- Enable the student to distinguish between rubber and other types of polymers

A2- Enabling the student to know the most important properties of different types of rubber and distinguish between them

A3- Enable the student to identify the most important rubber additives and their functions

A4- Enabling the student to learn about the most important rubber production methods

B. The skills goals special to the course.

B1. he skill of selecting a specific rubber for a specific application

B2 - The skill of determining the type of vulcanizer and special additives for the composition of each rubber

B3.

Teaching and Learning Methods

1- Live lectures to students

2- Electronic lectures supported by films

3 - Scientific trips to the Babylon Tire Factory

4- Conducting scientific experiments in the laboratory

Assessment methods

1- 2 monthly exams

2- Final exams

3- Daily duties

4- Attendance and participation in the electronic class

5- Evaluation of students' performance in the laboratory and evaluation of students' reports of experiments conducted in the laboratory

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C. Affective and value goals

C1. Knowing the reality of the rubber industry and ways to advance it to enhance the national economy

C2- Instilling the spirit of citizenship

C3- Working in a team spirit

Teaching and Learning Methods

1- Direct lectures for students.
2- Electronic lectures supported with films.
3- Scientific travels to Babylon tires factory.
4- Carrying out the scientific tests in laboratory.

Assessment methods

1- Two monthly exams

2- Final exams

3- Daily duties

4- Attendance and participation in the electronic class

5- Evaluation of students' performance in the laboratory and evaluation of students' reports of experiments conducted in the laboratory

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1-skils of solving math problems, integration and derivatives, using applied math .
D2- skills in engineering drawing
D3- skills of simulations software
D4-extract the results and predict with them.
D5-skills of creating CV and readdress companies.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		-introduction of elastomers - Similarities of Elastomers and Thermoplastic Polymers - Differences between Elastomers and Thermoplasts	lectures	
2	2		- Elastomer Types for General Purpose	lectures	
3	2		- Elastomer Types (Specialty Elastomers)	lectures	
4	2		-Compounding (Vulcanization and Curing, Reinforcement, Anti-Degradants)	lectures	
5	2		Compounding (Process Aids, Extenders & Tackifiers)	lectures	
6	2		-SULFUR-BASED CURE SYSTEMS	lectures	
7	2		-NON-SULFUR CURE SYSTEMS(Peroxides, Difunctional Compounds, Metal Oxides)	lectures	
8	2		-Filler Types (Carbon black, Kaolin Clay, Calcium Carbonate)	lectures	
9	2		-Filler Types(Precipitated Silica, Miscellaneous Fillers)	lectures	
10	2		RUBBER PROCESSING (Mastication, Masterbatching, Remilling)	lectures	
11	2		RUBBER	lectures	

			PROCESSING(Finish Mixing, Extruding, Calendering		
12	2		RUBBER PROCESSING(Vulcanization, Preparation, Press Curing, Flat Belting and Slab Cures)	lectures	
13	2		RUBBER PROCESSING(Open Steam Curing, Dry Heat Curing, Continuous Curing of Extrusions)	lectures	
14	2		Tire Engineering (Introduction, Tire Types and Performance)	lectures	
15	2		Tire Engineering (Basic Tire Design, Tire Engineering)	lectures	
16	2		Physical Testing of Rubber (Processability, Mooney Viscosity, Mooney Scorch)	lectures	

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	**1- . Alan N. Gent "Engineering with Rubber",2nd edition,2001** **2-James E. Mark, Burak Erman and Frederick R. Eirich" The Science and Technology of rubber", Third Edition,2005** **3- Peter A Ciullo and Norman Hewitt "The Rubber Formulary", 1999.**
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	**Internet**
12. The development of the curriculum plan	
1- 1- The course is developed by following up on the latest books and modern editions of approved	

books in the curriculum, while introducing new means of delivering information to the student. In addition to matching existing curricula in international universities and intensifying field visits to relevant industrial sites.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	polymer recycling / **418. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly-second semester /fourth year
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1. To develop problem solving skills and understanding theory through the application of techniques. 2. To teach student the main principles of science and engineering (structure and property recycling technology, also to use the material in engineering fields after recycling. 3. The main aim of studying the syllabus (polymer recycling) is to allow the student to understand the technology of recycling.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals
A1. To teach polymer recycling technology engineering.
A2. Recycling stages, machines and equipment used when recycling polymers.
A3. Methods and types of technology and its problems and solutions in recycling.

B. The skills goals special to the course.
B1. Acquire The skills of various methods of machining and watching various machines.
B2. Acquire the skills of solving different problems that is related with series with production process.
B3Aqcuire the skills in identify the physical phenomena that happened during manufacturing processes.
B4. Acquire the skills in dealing with programs that organized the production processes.

Teaching and Learning Methods

1. The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2. The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).
3. Publishing lectures on the Babylon University website.

Assessment methods:

Assessment methods

1. Classroom discussion during the lecture.
2. The sudden exam (cone).
3. Homework

Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1.Carrying out a miniature procedural research about a problem related with practical application of polymeric products.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4hr	Introduction – theoretical principle for engineering polymers recycling. Safety, concepts and practices in recycling process	Theoretical principles of recycle engineering of polymer and rubber	lecture	1- Give surprising questions 2- Classroom discussion
2	4hr	Classification, structure, characteristic and properties for used materials from polymer in recycling. The kinds of recycling, technology and it`s ways (recycling stages, operation of various types polymers recycling machine).	The properties of consumer polymers and rubber		
3	4hr	The ways of collecting polymer waste (operation procedure-waste collection, identification , sorting, washing). Emerging methods for processing and separation of polymers.	Types of techniques (recycle stages)		
4	4 hr	The study and knowledge of segregate PVC, PET, PP from other material.	Types of collection polymer wastes		

5	4hr	Dry engineering and cutting, technology of cutting. The cutting machines it's kinds and it's structure.	Methods of washing , cleaning, segregation		
6	4hr	Technology of producing granularities after cutting.	Engineering of drying and cutting, Techniques of cutting		
7	4hr	Technology of packing and storing. Other ways of getting rid from polymer waste (quality and send for packing).	Technique of transformation the rubber waste into powder		
8	4hr	Size and the importance of recycling in Iraq and the Arab world and other countries. Analyzing and the study of the bases and special study connected to recycling.	Technique of manufacturing granules after cutting		
9	4hr	Knowledge of the effect of polymer waste on environment (protecting environment). The means of burning polymer waste to obtain energy.	Technique of packing and storing		
10	4hr	The machines and the used equipment in recycling-source structure and maintains. The modern ways for recycling (process of recycling).	Another methods of disposal from polymer wastes		
11	4hr	The study and conference and the reference connected with recycling. How to operate and manage recycling, perform basic troubleshooting maintenance polymers recycling	The size and importance of recycling in Iraq, Arabic homeland and world		

		machine and auxiliary equipment.			
12	4hr	The level of recycling and the world production. Some of the used polymer (weight).	Analysis and studying the principles and studies that related with recycling		
13	4hr	Types of machines construction parts and it`s functions. Computer programs for recycling process. Recycling other materials	Knowledge the effect of polymer waste on environment (environment protection)		
14	4hr	Ways of forming in recycling (injection moulding process, extrusion moulding process, blow moulding process, compression). The cost of recycling process. Quality management system (QMS)	burning the polymeric waste in order to accroach energy		
15	4hr	Composite materials in recycling. The ability of understanding materials for recycling.	Machines and devices that used in recycling (origin, structure, maintenance)		

11. Infrastructure	
1. Books Required reading:	Al-Zubiedy A.: Polymer Technology, Forming and Recycling. Dar Al-Furat, Iraq, 2020
2. Main references (sources)	Manas Chanda & Salil K. Roy.: Plastics Fabrication and Recycling. CRC Press, USA, 2007
A- Recommended books and references (scientific journals, reports…).	Vannessa Goodship: Introduction to Plastics Recycling. 2nd Edition, Smithers Rapra Technology Limited, UK, 2007.

B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
It can be developed the curriculum through eruditeness on the new scientific references and different electronic networking sites	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	
2. Babylon university	Materials engineering/polymers and petrochemical industries depart.
3. course name /course code	design and selection of material II/**413. MEP**
4. Modes of Attendance offered	
5. Second Semester/fourth stage	Second Semester/fourth stage
6. Number of hours tuition (total)	75
7. 20/9/2024	
8. Aims of the Course 1- Providing the student with the basic knowledge of linking between theoretical and applied information, by introducing the basics of design and choosing the required characteristic in the	

application field, and providing the student with the main steps to choose materials for a specific application, as well as design mechanisms and preparing alternatives in case the choice is not possible and materials that meet the requirements of use.
2- The cost-to-function link with the manufacturing process for each design case
3- Optimizing the surface properties according to the design requirements

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals . A1. Full knowledge of the types of materials and their properties.
B- A2. Full knowledge of the basics of design and selection of materials
C- A3. Full knowledge of the basics of the relationship between cost, availability and cost of manufacturing operations
D- A4. Full knowledge of the field requirements

B. The skills goals special to the course. 1b. Acquisition of the skill in preparing designs for the theoretically required characteristics in the field of work
2b. Acquisition of skill in solving problems related to design types of mechanical properties and types of failures
3b. Gaining the skill to see the different types of cases studied in design and selection

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2-Discussion method
3- Publishing electronic lectures on the Babylon University website.
4- Giving the student different types of studied cases

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C- Emotional and moral goals
c1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
c4/ Encouraging correct answers and discussing wrong answers

Teaching and Learning Methods

J1- Develop all the capabilities of the department, college and human resources to teach and help students to learn and acquire skills and knowledge.
J2- Focusing on applications related to global technological progress to aid learning.

Assessment methods

1-Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1. Preparing some integrated designs for some engineering parts

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	12		Design and selection of materials for surfaces requirements	Lecture, tutorial	exam
4-6	8		The relation between the materials selection and materials processing	Lecture, tutorial	=
6-8	8		Transport structures Aircraft, automobiles ,trains	Lecture, tutorial	=
8-10	8		Materials for ships structures	Lecture, tutorial	=
10-12	8		Materials for electric and electronic uses	Lecture, tutorial	=
12-14			Materials for resistance of firing and flame retardant	Lecture, tutorial	=
14-15	4		The yield behavior in polymers	Lecture, tutorial	=

11. Infrastructure	
1. Books Required reading:	Material selection in engineering design Ashby
2. Main references (sources)	An introduction for materials engineering and application ashby
A- Recommended books and references (scientific journals, reports…).	

B-Electronic references, Internet sites…	Yes Google scholar

12. The development of the curriculum plan
The course can be developed by looking at the latest references to the topic from various sources global publishing houses world information network net

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	Design and selection of materials I/**413.MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly, 1st semester - Stage Three
6. Number of hours tuition (total)	75
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course 1- Providing the student with the basic knowledge of linking between theoretical and applied information, by introducing the basics of design and choosing the required characteristic in the application field, and providing the student with the main steps to choose materials for a specific application, as well as design mechanisms and preparing alternatives in case the choice is not

possible and materials that meet the requirements of use.
2- The cost-to-function link with the manufacturing process for each design case
3- Optimizing the surface properties according to the design requirements

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals . A1. Full knowledge of the types of materials and their properties.
B- A2. Full knowledge of the basics of design and selection of materials
C- A3. Full knowledge of the basics of the relationship between cost, availability and cost of manufacturing operations
D- A4. Full knowledge of the field requirements

B. The skills goals special to the course. 1b. Acquisition of the skill in preparing designs for the theoretically required characteristics in the field of work
2b. Acquisition of skill in solving problems related to design types of mechanical properties and types of failures
3b. Gaining the skill to see the different types of cases studied in design and selection

Teaching and Learning Methods

1- The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).
2-Discussion method
3- Publishing electronic lectures on the Babylon University website.
4- Giving the student different types of studied cases

Assessment methods

1- Classroom discussion during the lecture.
2- The sudden exam (cone).
3- Homework
4- Monthly exams (number 2) and exams for the final courses.

C- Emotional and moral goals
c1/ Asking intellectual questions that require effort on the part of the student to reach the final product.
C/2 Prepare reports on laboratory experiments and answer their questions.
C3: Make the lesson of high importance in terms of lecture time, scientific material and discipline.
c4/ Encouraging correct answers and discussing wrong answers

Teaching and Learning Methods

J1- Develop all the capabilities of the department, college and human resources to teach and help students to learn and acquire skills and knowledge.
J2- Focusing on applications related to global technological progress to aid learning.

Assessment methods
1-Direct and surprising questions for students. 2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development) D1. Preparing some integrated designs for some engineering parts D2. D3. D4.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	12		Types of engineering materials and their properties metals , ceramics , polymers and composites materials	Lecture, tutorial	exam
4-6	8		The principles requirements for making decision of selection of materials	Lecture, tutorial	=
6-8	8		Services requirement and analysis of failures causes	Lecture, tutorial	=
8-10	8		Design and selection of materials for mechanical properties requirements, stiffness	Lecture, tutorial	=
10-12	8		Design and selection of materials for mechanical properties requirements, plastic deformation	Lecture, tutorial	=
12-14			Design and selection of materials for mechanical properties requirements. Fast fracture (toughness)	Lecture, tutorial	=
14-15	4		Design and selection of materials for mechanical properties requirements fatigue	Lecture, tutorial	=

			and creep		

11. Infrastructure	
1. Books Required reading:	Material selection in engineering design Ashby
2. Main references (sources)	An introduction for materials engineering and application ashby
A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	Yes Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at the latest references to the topic from various sources global publishing houses world information network net	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Babylon University /Collage of Material Engineering

2. University Department/Centre	Polymer and petrochemical industries
3. Course title/code	Polymer blend /**418. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	First Semester / fourth year
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	22/9/2024

8. Aims of the Course

1- Knowing the types of polymeric mixtures and mixing methods, as well as the factors that affect mixing

2- Studying the solubility of polymers and the factors that affect the solubility of polymers in different solvents

3- Knowing the thermodynamic effect of polymeric mixtures and studying the phase diagram of polymeric mixtures

4- Study the theories of mixtures of liquids

5- Study of the morphology of polymeric mixtures, their types and methods of controlling and dividing them

6- Studying the methods of processing polymeric mixtures and their effect on the morphological properties of the mixture

8-Studying recent developments in nanostructure mixing systems

9- Applications of alloys and polymeric mixtures
10- Effect of aging and decomposition of polymeric mixtures

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
.A1- Full knowledge of the types of polymeric mixtures
A2- Full knowledge of the purpose of manufacturing polymeric mixtures
A3- Knowledge of methods for manufacturing polymeric mixtures
A4- Full knowledge of the change that occurs in the mechanical and physical properties that occur in polymeric mixtures.
A5- Knowledge of traditional polymer mixtures and their applications
A6- Full knowledge of the manufacture of engineering polymer mixtures and special polymers and their applications

B. The skills goals special to the course.
B1 - Acquisition of skills in identifying types of polymeric mixtures
B2 - Acquisition of skills in the methods of manufacturing these mixtures
B3 - Acquiring the skill of determining the type of mixture that is homogeneous, heterogeneous, or compatible
B4 - Gaining skill in determining suitable combinatorial methods for polymeric mixtures

Teaching and Learning Methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1- Conducting small research on specific applications in practical life
D 2- Homework.

Assessment methods

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	10	Know the factors that affect mixtures and study the solubility	Introduction to Polymer Blend, Types of polymer blends:, Polymer Blend Vs. Polymer Alloy:, Evolution of Polymer Alloys and Blends:, Methods of Blending, The advantages of blending, Commodity Resins and Their Blends, Engineering Resins and Their Blends, Specialty polymers and Their blends	Direct lectures	Class participation and surprise exams
4-8	10	thermodynamics of mixtures	**Polymeric Liquid Mixtures, Thermodynamics of Polymer Blends, phase separation,nucleation and growth mechanism,spinodal decomposition, Cloud Point, Cloud-Point Curve, Cloud-Point Temperature, Gibbs Phase Rule Polymer solvent diagram,**		

9-11	10	fluid mixing theories	**Solubility of Polymers, SOLVENT POWER, SolubilityParameter , Effect of system variables on solubility, Huggins-Flory theory, Equation of State Theories, Gas-lattice Model, Off-lattice Theories,Strong Interactions Model, Heat of Mixing Approach, Solubility Parameter Approach**		
11-13	10	Morphology	**Introduction, Phase Domain, Continuous Phase Domain, Discontinuous Phase Domain, Core-Shell Morphology, Fibrillar Morphology Onion Morphology, Lamellar Domain Morphology, Multicoat Morphology Characterization Polymer Morphology Morphology and other ultimate mechanical properties**		
14-15	5	Knowledge of methods for manufacturing applications of alloys and polymeric mixtures	**Polymer Blends Processing, Morphology development, Breakup and Coalescence Balance, Effect of Copolymer on Coalescence, Effect of processing and material parameters on morphology ,**		

			Forming Polymer Blends, Processability, Flow-induced Morphology		

11. Infrastructure

1. Books Required reading:	Polymeric Blends Basic texts: live lectures polymer blend, Hard Book
2. Main references (sources)	Micro and nanostructured multiphase Polymer Blend System
A- Recommended books and references (scientific journals, reports…).	Googl scholar
B-Electronic references, Internet sites…	Googl scholar
12. The development of the curriculum plan	
Access to books and electronic research in the field of polymeric mixtures via the Internet	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Babylon
2. University Department/Centre	Faculty of Materials Engineering/Department of Polymer and Petrochemical Industries
3. Course title/code	technology of polymers /**418. MEP**

4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly -first semester / fourth stage
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2024

8. Aims of the Course

4. Teach the students polymers forming technology.
5. Supply the students with knowledge of machines and molds for polymers forming.
6. Teaching the computer programs and various developments in polymer forming technology.
7. Educate the students with types of problem solutions at forming operations.

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A-Cognitive goals

A1-Identify the principles of annealing in polymer formation processes.
A2-Describe the different molding processes for polymeric materials.
A3-Summarize what is meant by extrusion and injection molding.
A4-Discuss the interaction and participation of the process and transformation of the phases in which the polymeric materials were formed upon formation.
A5-A description of the different machines for forming polymers.
A6-Description of software use when injection molding and extrusion.

B. The skills goals special to the course.
B1. Acquire The skills of various methods of machining and watching various machines.
B2. Acquire the skills of solution different problems that is related with series with production process.
B3Aqcuire the skills in identify the physical phenomena that happened during manufacturing processes.
B4. Acquire the skills in dealing with programs that organized the production processes.

Teaching and Learning Methods

1. The method of delivering the lecture and it includes the following foundations (the introduction and the prelude to the lesson, the presentation of the material as a coherent sequential presentation).

2.The method of discussion, i.e. (making the student the center of effectiveness instead of teaching).

3.Publishing lectures on the Babylon University website.

Assessment methods

4. Classroom discussion during the lecture.
5. The sudden exam (cone).
6. Homework
7. Monthly exams (number 2) and exams for the final courses.

C. Affective and value goals

C1/ Asking intellectual questions that require effort from the student to reach the final product.
C/2 Prepare reports about laboratory experiments and answer their questions.
C3: Make the lesson of high importance with respect to lecture time, scientific material and discipline.
C 4 / Encourage correct answers and discuss wrong answers.

Teaching and Learning Methods

J1- Develop all the department's capabilities and human resources to teach and help students learn and acquire skills and knowledge.
J2- Focus on applications related to daily life to aid learning.

Assessment methods

1- Direct and surprising questions for students.
2- High competition in the classroom among students to motivate them to think more

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1. Carrying out a miniature procedural research about a problem related with practical application of polymeric products.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4hr	Introduction, the theoretical bases of forming polymers. Melt flow index (MFI, MIF).	Introduction about technology of polymer forming	lecture	1- Give surprising questions 2- Classroom discussion
2	4hr	The types and ways of forming. Screws, it's kinds and design.	Theoretical principles of polymer forming		
3	4hr	The kinds of technology and forming by injection. The machines and ways of injection.	Types of formation methods		
4	2 hr	The parameters in injection machines (pressure- time-heat). The use of computer programs in forming by injectiingon. Special injection molding processes.	Types and designs of screws		
5	4hr	The kinds of technology forming by extrusion. The machines and extruder equipment	Types of injection molding techniques		
6	4hr	The parameters in extruder machines (heat and speed). Computer programs and the modern ways by extruder.	Injection machines		
7	4hr	Moulds, kinds, structure. The ways of forming by pressing (compression moulding).	Parameters of injection machines (temperature, time, pressure)		

8	4hr	Jet moulding, centrifugal moulding. The technology of forming polymers bottles by blowing	The using of programs in injection molding		
9	4hr	Adhesion,welding, cutting and equipment cutting.	Type of extrusion molding techniques		
10	4hr	Technology of painting the polymer products, fiber spinning. The ways and machines of producing nylon.	Devices and machines of extrusion		
11	4hr	Technology of forming the rubber, it's kinds and ways. The modern technology in polymer technology	Parameters of extrusion machines (temperature, screw speed)		
12	4hr	The models and mathematical equation used in forming technology. Condition and organizing technology forming.	Programs and new methods of extrusion		
13	4hr	The study and analyze by forming. Plasticity's and adding to polymers in forming.	Types and designs of molds		
14	4hr	Organizing production lines for forming technology. Hydraulic system for forming machines.	Formation technique By heat and الخلخلة		
15	4hr	Temperature system (heat-cool) for forming machines. The way of maintains for forming machines			

11. Infrastructure

1. Books Required reading:	Al-Zubiedy A.: Polymer Technology, Forming and Recycling. Dar Al-Furat, Iraq, 2020.
2. Main references (sources)	Manas Chanda & Salil K. Roy.: Plastic Technology Handbook. 4th Edition, CRC Press, USA, 2007
A- Recommended books and references (scientific journals, reports…).	"Principles of polymer engineering" by C. B. Bucknall.
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum	
It can be developed the curriculum through eruditeness on the new scientific references and different electronic networking sites	

Course Description Form

1. Course Name:
English Language I
2. Course Code:
3. Semester / Year:
First semester / fourth year
4. Description Preparation Date:
20/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 h
7. 1/2023 administrator's name (mention all, if more than one name)

Name: Dr. Qassim Ahmed Mekheef

Email: mat.qassim.mekheef@uobabylon.edu.i

8. Course Objectives

Course Objectives	The objectives of English language teaching are: To enable students to learn and comprehend the written and spoken form of English language. To teach functional English to the learners and to polish their reading skills, writing skills and listening skills.

9. Teaching and Learning Strategies

Strategy	1. Cultivate relationships. 2. Be culturally aware. 3. Teach language skills across all curriculum topics. 4. Speak slowly and be patient. 5. Prioritize "productive language" ... 6. Use a variety of methods to engage learning. . 7. Utilize visual aids. 8. Coordinate with the ESL teacher

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	The students learn how to use speak, read and academic writing for studding engineering	Gramer 1	Lecture	Direct questions+ QUIZ +HW
Week 2	2		Gramer2	Lecture	
Week 3	2		Gramer 3	Lecture	
Week 4	2		Gramer 4	Lecture	
Week 5	2		Speaking	Lecture	
Week 6	2		Reading	Lecture	
Week 7	2		Writing	Lecture	
Week 8	2		Gramer 5	Lecture	
Week 9	2		Gramer 6	Lecture	
Week 10	2		Gramer 7	Lecture	
Week 11	2		Speaking	Lecture	
Week 12	2		Reading	Lecture	
Week 13			writing	Lecture	

Course Description Form

1. Course Name:

English Language II

2. Course Code:
3. Semester / Year:
Second semester / fourth stage
4. Description Preparation Date:
20/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 h
7. 1/2023 administrator's name (mention all, if more than one name)
Name: mat.qassim.mekheef@uobabylon.edu.i Email:

8. Course Objectives	
Course Objectives	The objectives of English language teaching are: To enable students to learn and comprehend the written and spoken form of English language. To teach functional English to the learners and to polish their reading skills, writing skills and listening skills.

9. Teaching and Learning Strategies	
Strategy	1. Cultivate relationships. 2. Be culturally aware. 3. Teach language skills across all curriculum topics. 4. Speak slowly and be patient. 5. Prioritize “productive language” ... 6. Use a variety of methods to engage learning. . 7. Utilize visual aids. 8. Coordinate with the ESL teacher

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8 Week 9 Week 10 Week 11 Week 12 Week 13	2 2 2 2 2 2 2 2 2 2 2 2 2	The students learn how to use speak, read and academic writing for studding engineering	Gramer 8 Gramer9 Gramer 10 speaking Speaking Reading Reading Writing Gramer 11 Gramer 12 Speaking Reading writing	Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture Lecture	Direct questions+ QUIZ +HW

1. Teaching Institution	University of Babylon/College of Materials Engineering
2. University Department/Centre	Polymer engineering and petrochemical industries
3. Course title/code	Technology of Petrochemical Industries / **412. MEP**
4. Modes of Attendance offered	weekly
5. Semester/Year	Quarterly –second semester / fourth stage
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	20/9/2024
8. Aims of the Course	
1- Learn about the principles and basics of the petrochemical industries 2- Acquiring the scientific skill in selecting and designing the appropriate operating units for a particular product 3- The student's dependence on scientific skills and their support for the practical aspect.	

9. Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Cognitive goals . A1- Enabling the student to understand and distinguish between the primary, intermediate and final materials of these industries A2 - Enable the student to know the basic operational units in the petrochemical industries A3- Study of physical and chemical methods for the production of petrochemical products A4- Study of important polymer production processes

B. The skills goals special to the course.
B1. Acquisition of skill in the selective of the suitable separation process.
B2. understanding the petrochemical processes
B3.

Teaching and Learning Methods

1- Online lectures directly to students
2- Seminars and research

Teaching and Learning Methods

1- Monthly exam number 2 + final exam
2- Surprise exams
3- Class participation
4- Evaluation of seminars and homework

C. Affective and value goals
C1. Direct electronic lectures for students.
C2. seminars and researches.
.

Assessment methods

1- 1- class post
2- 2- Surprise exams
3- 3- Monthly and final exams
4- 4- Evaluation of seminars and research

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1. Conducting a mini-action research on a problem related to the practical application aspect of Petrochemical industries.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	**2 hr**	Distillation	Continuous distillation	Lectures directly	Classroom Give surprising questions
2	**2 hr**	Extraction	batch distillationion	Lectures directly	
3	**2 hr**	Filtration	Extraction Principle .	Lectures directly	
4	**2 hr**	Draying	Extraction Process	Lectures directly	
5	**2 hr**	Absorption	Defi nition of Terms Related to Extraction	Lectures directly	
6	**2 hr**	Polystyrene	Mechanism of	Lectures	

		(PS)	filtration	directly	
7	**2 hr**	POLYPROPYLENE	Types of filters	Lectures directly	
8	**2 hr**	Polyvinyl chloride (PVC)	The purpose of drying	Lectures directly	
9	**2 hr**	POLYETHYLENE	Fundamentals of the drying process	Lectures directly	
10-11	**4 hr**	**SYNTHETIC RUBBER**	Dryer equipments	Lectures directly	
12	**2 hr**	**POLYCHLOROPRENE (Neoprene Rubber)**	Types of absorption	Lectures directly	
13	**2 hr**	Polyisoprene	Absorption Equipment	Lectures directly	
14-15	**4 hr**	THERMOSETTING PLASTICS	Properties and Uses of Styrene Polymers	Lectures directly	

11. Infrastructure	
1. Books Required reading:	***1. Chemical Engineering, Volume (2) By Coulson & Richardson s, Fifth edition, 2002***
2. Main references (sources)	***Chemical Engineers Handbook. By Robert H.Perry.Don***
A- Recommended books and references (scientific journals, reports…).	***Baghdad oil training institute (lectures)***
B-Electronic references, Internet sites…	Google scholar
12. The development of the curriculum plan	
The course can be developed by looking at modern resources and the Internet.	

Course Description Template

Course Description by Prof. Dr. Nizar Jawad Hadi

This course description provides a concise summary of the key characteristics of the course and the expected learning outcomes that students are anticipated to achieve, demonstrating whether they have maximized the available learning opportunities. It is essential to link this description with the program description.

Educational Institution: Ministry of Higher Education and Scientific Research - University of Babylon
Department / Center: Polymer Engineering and Petrochemical Industries
Course Name / Code: Polymer Rheology I / **314. MEP**
Available Attendance Modes: Weekly Attendance
Semester / Year: first semester/ third stage
Total Study Hours: 60
Date of Description Preparation: 20/9/2024
Course Objectives:

Rheology of Polymers Utilize rheological properties in practical and numerical studies and the design of polymer-related equipment. **Course Learning Outcomes, Teaching Methods, and Assessment** **A. Cognitive Objectives** A1- Enhance students' skills and foster scientific thinking and creativity. A2- Graduate professionals equipped with science, knowledge, and modern technology. A3- Produce scientifically skilled graduates capable of practicing their specialization in various fields. A4- Provide a clear understanding of fundamental concepts and integrate their knowledge into different engineering disciplines. A5- Stay updated with the latest applications, developments, and scientific advancements in the field of polymers. A6- Provide a solid foundation for numerous other sciences.
B. Skill-Based Objectives Specific to the Course B1- Introduce students to the importance of polymer flow in polymer manufacturing processes, internal structure, and final properties. B2- Study how to control polymer properties by managing operating conditions in its liquid state. B3- Introduce different polymer flow models.

B4- Familiarize students with polymer rheology testing devices.
B5- Study the relationship between polymer movement and structural changes in the material.
B6- Examine the effect of flow in the liquid phase on the final polymer properties.

Teaching and Learning Methods

With the passage of time, educational institutions have increased due to the growing demand for education among students. Universities are considered educational institutions that offer various lessons to all their students. They are among the most developed educational environments, attracting students from different regions. Professors in universities rely on modern teaching methods. As a result of scientific advancement, some university students now use more advanced tools in their learning process.
Professors employ various methods to help their students understand and learn more efficiently. Since teaching is a planned process aimed at helping students acquire skills, professors adopt several strategies to achieve this goal. The choice of teaching strategy depends on several factors, including the professor's personality and self-confidence, the students' academic level, and the subject being taught.
To select an appropriate teaching method, the process should involve the following approaches:

- **Lecture Method:** Delivering direct lectures to students.
- **Scientific Trips:** Organizing educational field trips.
- **Video Lectures:** Using recorded video lectures as a teaching aid.
- **Assessment-Based Learning:** Implementing exams and quizzes to evaluate and reinforce learning.

Assessment Methods

Final or summative assessment is used to evaluate student performance at the end of the teaching period or academic year based on a set of specific criteria. These assessments can be national or local evaluations and are generally less flexible than other types of assessments.
The assessment methods include:

1. **Monthly Exams**
2. **End-of-Course Exam**
3. **Surprise Written and Online Exams via the Moodle Platform**
4. **Homework Assignments**
5. **Classroom Participation**
6. **Seminar Preparation Assignments**

C- Affective and Value Objectives
C1- Understanding the current state of the industry in general and ways to improve it to strengthen the national economy.
C2- Instilling a sense of patriotism.
C3- Encouraging teamwork.
C4- Motivating students to apply theoretical knowledge through simulation as practical ideas in real-life scenarios.

D- General and Transferable Skills (Other Skills Related to Employability and Personal Development)
D1- Problem-solving skills in mathematics and the use of advanced applied mathematics.

D2- Modeling skills.
D3- Deriving results and making predictions.
D4- Communication skills with companies.
D5- Scientific consulting skills.

11- Course Structure

Week	Hours	Learning Outcomes	Unit/Topic Name	Teaching Method	Assessment Method
First	4	Introduction to the general concept of rheology and polymer rheology	Overview to polymer rheology	Lecture and discussion	Exam
Second	4	Newtonian and non-Newtonian flows	Newtonian and non-Newtonian flows	Lecture and Q&A	Tests
Third	4	Basic flow characteristics of polymers	Basic flow characteristic of polymers	Lecture and discussion	Exam
Fourth	4	Types of polymer flow: shear flow and extensional flow	Polymer flow types: shear flow and extension flow	Lecture and Q&A	Exam
Fifth	4	Linear viscoelasticity and mechanical models	Linear viscoelasticity and mechanical models	Discussion and problem-solving	Summative assessment
Sixth	4	Non-linear viscoelasticity	Non-linear viscoelasticity	Lecture and discussion	Tests
Seventh	4	Cox-Merz rule and pressure effect on viscosity	Cox-Merz rule	Lecture and Q&A	Assessment
Eighth	4	Temperature dependence	Temperature dependence	Lecture and discussion	Exam
Ninth	4	Pressure dependence	Pressure dependence	Lecture and discussion	Tests
Tenth	4	Polymer flow in testing devices	Viscometric flows	Lecture and Q&A	Exam
Eleventh	4	Extension flows	Extension flows	Lecture and discussion	Exam
Twelfth	4	Rheological properties and polymer processes	Viscosity models for shear thinning polymer melts	Lecture and Q&A	Summative assessment
Thirteenth	4	Measuring rheological properties: Polymer solution viscosity measurement	Rheometry: Cone plate viscometer	Lecture and Q&A	Exam
Fourteenth	4	Measuring polymer melt flow rates and viscosity	Melt flow indexer	Lecture and discussion	Exam
Fifteenth	4	Capillary rheometer	Capillary rheometer	Discussion and problem-solving	Summative assessment

12- Infrastructure

1- **Required Textbooks:**

- *Rheological Characterization of Polymer Melts in Shear and Extension: Measurement Reliability and Data for Practical Processing.* Johhano Aalto, 2011

2- **Main References (Sources):**

- *Principles of Polymer Processing.* Tadmor, G. Gogs
- **Recommended Books and References (Scientific Journals, Reports, etc.):**
    - *Rheology and Processing of Polymeric Materials.* C.D. Han
    - *Flow Properties of Polymer Melts.* A. Brydson
    - *Rheology: Principles, Measurement, and Application.* Matthew Tirrell

3- **Online References and Websites:**

- www.hazemsakeek.com

13- Course Development Plan
Reviewing the department's regulations to align with the educational process requirements. • Encouraging e-learning and self-directed learning to support the achievement of the institution's mission and objectives based on community needs. • Incorporating self-learning opportunities within the curriculum to achieve targeted learning outcomes through field trips. • Dividing students into small groups and motivating them towards self-directed learning. • Ensuring that teaching methods used are appropriate for the intended learning outcomes. • Designing effective field training programs for students in accordance with the targeted learning outcomes. • Ensuring the institution enhances and diversifies written examinations to assess the intended educational outcomes. • Committing to announcing examination schedules and results within appropriate timelines. • Considering students' preferences when setting the exam schedule timelines. • Ensuring the availability of visual aids and advanced teaching technology, with a need for regular updates to keep pace with educational advancements