

Academic Program Description Form

University Name: ...University of Babylon...

Faculty/Institute: College of Engineering.....

Scientific Department: Mechanical Engineering.....

Academic or Professional Program Name:...Bachelor of engineering.....

Final Certificate Name:.... Bachelor's degree in mechanical engineering....

Academic System:Semester....

Description Preparation Date:

File Completion Date:



Signature:

Scientific Associate Name:

Prof. Dr. Ali Hassoon Nabhab

Date:



Signature:

Head of Department Name:

Prof. Dr. Rehab Noor Mohammed Al-Kaby

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Department:

Date:

Signature:



Approval of the Dean

نموذج وصف البرنامج الأكاديمي

اسم الجامعة جامعة..... بابل...

الكلية المعهد كلية ... الهندسة.....

القسم العلمي: قسم الهندسة الميكانيكية

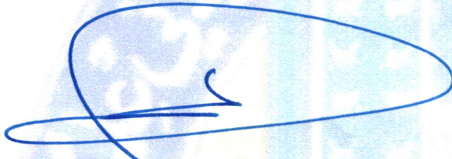
اسم البرنامج الأكاديمي او المهني: بكالوريوس هندسة

اسم الشهادة النهائية بكالوريوس في الهندسة الميكانيكية

النظام الدراسي فصلي

تاريخ اعداد الوصف

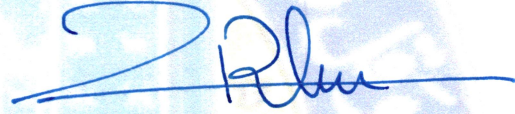
تاريخ ملء الملف:



التوقيع:

اسم المعاون العلمي ا.د. علي حسون نهاب

التاريخ:



التوقيع:

اسم رئيس القسم ا.د. رحاب نور محمد

التاريخ:

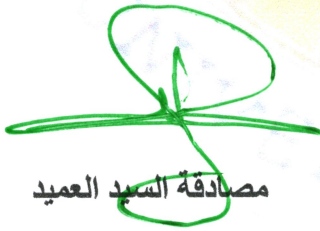
دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ:

التوقيع:



مصادقة السيد العميد



جامعة بابل / كلية الهندسة

قسم الهندسة الميكانيكية

العدد : 284 مك

التاريخ: 1/ 9/ 2025

م/تشكيل لجنة أعداد الوصف الأكاديمي لمنهاج قسم الهندسة الميكانيكية

باللغتين الإنجليزية والعربية للعام الدراسي 2025-2026

استنادا الى الصلاحيات المخولة لدينا:

تقرر تشكيل لجنة اعداد الوصف الأكاديمي لمنهاج قسم الهندسة الميكانيكية باللغتين الإنجليزية والعربية للعام الدراسي 2025-2026 ومؤلفة من الأسماء ادناه:

- 1- أ. د. رهاب نور محمد
- 2- م.د. باسل مهدي هادي
- 3- م.د. احمد وليد حسين
- 4- الست سناء عباس حديد



أ.د. رهاب نور محمد

رئيس قسم الهندسة الميكانيكية

العدد : ٤ / مك س

التاريخ : 2025 / 11 / 16

سري

إلى / عمادة كلية الهندسة / أمانة مجلس الكلية

م/ محضر مجلس القسم الجلسة (السابعة)

للعام الدراسي 2025 – 2026

السلام عليكم ورحمة الله وبركاته

نحيل إليكم محضر مجلس القسم بجلسته السابعة والتي انعقدت بتاريخ
2025 / 11 / 14 للعام الدراسي 2025 – 2026 والتي تضمنت الفقرات التالية

أولا : صلاحيات مجلس الكلية

ثانيا : محضر اللجنة العلمية (الجلسة الثانية عشر)

ثالثا : محضر المختبرات العلمية

للتفضل بالاطلاع والمصادقة مع الاحترام

Signature of Dr. M. H. Al-Mutairi

د. د. م. ه. المضير
رئيس قسم الهندسة الميكانيكية

2025/ 11 / 16

نسخة منه الى //

- اضبارة محاضر مجلس القسم للعام الدراسي 2024 - 2025
- الصادرة

كلية الهندسة / قسم الهندسة الميكانيكية
اللجنة العلمية 2026/2025
محضر اللجنة العلمية / الجلسة الثامنة

عقدت اللجنة العلمية في قسم الهندسة الميكانيكية جلستها الثامنة للعام الدراسي (2025-2026) في رئاسة القسم في يوم الخميس المصادف 2025/10/2 برئاسة الاستاذ الدكتور ضرغام عبد الحسن عبد الحسين الكترونيا وبحضور كافة أعضاء اللجنة العلمية، وناقشت اللجنة المواضيع المطروحة واتخذت القرارات المناسبة بشأنها وكما يلي: -

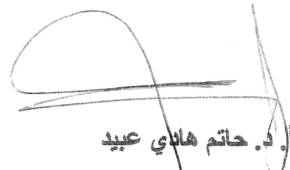
تعديلات المقررات الدراسية لنظام بولونيا

ناقشت اللجنة العلمية الطلب المقدم من رئاسة القسم بشأن اجراء التعديلات اللغوية وتصحيحات الترجمة لبعض المقررات الدراسية ووحداتها لينسجم مع متطلبات نظام بولونيا للمراحل الدراسية الأولى والثانية والثالثة لأجل إدخالها في قواعد النظام المتبع.

التوصية: -

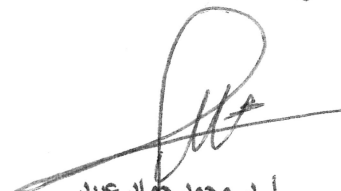
توصي اللجنة العلمية بالموافقة على اجراء التعديلات المطلوبة وفقا للطلب المرفق طيا.


أ.د. احمد كاظم حسين
عضوا


أ.د. حاتم هلاي عبيد
عضوا


أ.د. حميد كاظم حمزة
عضوا


أ.د. ضرغام عبد الحسن عبد الحسين
رئيس اللجنة العلمية


أ.د. محمد جواد عبيد
مقرر اللجنة العلمية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computer Science		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102026			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGI	Semester of Delivery		Two
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Najlaa Ali Hussein		e-mail	eng.najlaaali.hussein@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	N.A.		e-mail	N.A.
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	–
Co-requisites module	None	Semester	–

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To develop student skills for solving most related mathematical problems in mechanical engineering by MATLAB. 2. To learn how to write a program code and script. 3. To learn how to import and export data. 4. To understand how to construct the matrix and find the matrix indexing and arithmetic. 5. To understand the built-in functions in MATLAB 6. To cover statements in MATLAB that allow other statements to be repeated which are called loops. 7. To learn solving a set of linear equations. 8. To learn coding numerical differentiation and integration. 9. To learn 2D plotting techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students can easily use MATLAB interface and type proper codes or basic commands into the command window. 2. Identify different methods used to construct a matrix and learn how to deal with matrix arithmetic and indexing. 3. Students intended to have the ability of how to write a script and save it and open files. 4. Learning how to convert a string into a number and conversely. 5. Learning how to perform numerical differentiation and integration using symbolic functions. 6. Understanding how a set of linear equations could be solved. 7. Learning the 2D plotting skills by MATLAB.
Indicative Contents المحتويات الإرشادية	- Introduction to MATLAB [5 hrs] - Basic Operations [3 hrs] - Scalar Arithmetic's [3 hrs] - Matrix Construction [5 hrs] - Matrix Indexing [4 hrs] - Matrix Arithmetics [5 hrs] - String manipulation [3 hrs] - Loops and Controls [6 hrs] - Functions [5 hrs] - Differentiations and Integrals in MATLAB [5 hrs] - solving a set of linear equations. [5 hrs] - Figure and Axes [5 hr] - 2D Plotting [5 hrs] - the ezplot family [3 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in programming, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by computer lab.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9, 13	LO #1, 3 and 5
	Assignments	4	10% (10)	3,6,9,12	LO #1-5
	Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 3, 5 and 6
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	LO # 1-6
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to MATLAB
Week 2	Basic Operations
Week 3	Scalar Arithmetics
Week 4	Matrix Construction
Week 5	Matrix Indexing
Week 6	Matrix Arithmetics
Week 7	String manipulation
Week 8	Loops and Controls
Week 9	Functions
Week 10	Differentiations and Integrals in MATLAB
Week 11	Mid-term exam
Week 12	Solving a set of linear equations.
Week 13	Figures and Axes
Week 14	2D Plotting
Week 15	The ezplot family
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to MATLAB
Week 2	Lab 2: Executing the Basic Operations
Week 3	Lab 3: Executing the Scalar Arithmetics
Week 4	Lab 4: Executing the Matrix Construction
Week 5	Lab 5: Executing the Matrix Indexing
Week 6	Lab 6: Executing the Matrix Arithmetics
Week 7	Lab 7: Quiz
Week 8	Lab 8: Executing the String manipulation

Week 9	Lab 9: Executing the Loops and Controls
Week 10	Lab 10: Executing the Differentiations and Integrals in MATLAB by using symbolic function
Week 11	Lab 11: Solving a set of linear equations.
Week 12	Lab 12: Practicing on Figure and Axes
Week 13	Lab 13: Practicing on 2D Plotting
Week 14	Lab 14: Quiz
Week 15	Lab 15: Practicing on the ezplot family

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to MATLAB, California Institute of Technology, ACM11 Spring, 2015.	No
Recommended Texts	MATLAB a Practical introduction to programming and Problem Solving, Stormy Attaway, Boston University, Fourth edition, 2017.	No
Websites	https://www.coursehero.com/file/38467738/Introduction-to-MATLAB-ACM11-Spring-2015-California-Institute-of-Tech/	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics II		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102021		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Basil Mahdi Hadi Al-Srayyih	e-mail	eng.basilm.hadi@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Basil Mahdi Hadi Al-Srayyih	e-mail	eng.basilm.hadi@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics I UOBAB0102011	Semester	1
Co-requisites module	None	Semester	----

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1) This module aims to reinforce students 'previous knowledge and to develop new basic mathematical techniques needed to support the engineering subjects that will take in the next levels. 2) It also provides knowledge of how the student will solve the mathematical problems of the selected subjects using higher-level thinking skills, including critical thinking and creativity. 3) Students learn how to plot the mathematical functions of the selected subjects. 4) To encourage students in solving mathematical problems precisely without mistakes. 5) This module improves students' skills in solving mathematical problems in the next levels of study.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students have knowledge in Limits and continuity. 2. Students have knowledge to find the differentiation using its rules. 3. Students are able to find the higher derivatives and Implicit differentiation. 4. Students are able to solve the exponential and logarithmic functions differentiations. 5. Students are able to solve the Trigonometric and inverse Trigonometric differentiations. 6. Students have knowledge about how to find the Hyperbolic and inverse Hyperbolic functions differentiations. 7. Students have knowledge about how to find the integration using the Substitution and Parts rules. 8. Students have knowledge about how to find the integration of the rational functions by partial fractions rule. 9. Students have knowledge about how to find the area and volume using the double and triple integrals. 10. Students have knowledge about the basic concept of the Infinite sequences and Geometric series.
Indicative Contents المحتويات الإرشادية	- Limits and continuity [6 hrs] - Differentiation and its rules [6 hrs] - Higher derivatives and Implicit differentiation [6 hrs] - Exponential and logarithmic functions differentiations [6 hrs] - Trigonometric differentiations [6 hrs] - Inverse Trigonometric functions differentiations [6 hrs] - Hyperbolic functions differentiations [6 hrs] - Inverse hyperbolic functions differentiations [6 hrs] - Integration by Substitution and Parts rules [6 hrs] - Integration of rational functions by partial fractions [6 hrs]

	- Area, volumes, double and triple integrals [6 hrs] - Infinite sequences and Geometric series [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is: 1) To encourage students' participation in solving the mathematical problems in groups during the tutorials. 2) Activate the critical thinking skills of the students. 3) Encourage the students to ask questions in the classes. 4) Encourage the students to introduce home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	9,12	LO # (1-6) and (7)
	Assignments	2	10% (10)	9,12	LO # (1-6) and (7)
	Lab	-	-	Continuous	
	Report	1	10% (10)	14	LO # 9

Summative assessment	Midterm Exam	2 hrs	10% (10)	13	LO # 1-8
	Final Exam	3 hrs	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Limits and continuity
Week 2	Differentiation and its rules
Week 3	Higher derivatives and Implicit differentiation
Week 4	Exponential and logarithmic functions differentiations
Week 5	Trigonometric differentiations
Week 6	Inverse Trigonometric functions differentiations
Week 7	Hyperbolic functions differentiations
Week 8	Inverse hyperbolic functions differentiations
Week 9	Integration theorems and its applications
Week 10	Indefinite and definite integrals
Week 11	Integration by Substitution and Parts rules
Week 12	Integration of rational functions by partial fractions
Week 13	Mid-term exam
Week 14	Area, volumes, double and triple integrals
Week 15	Infinite Sequences and Geometric Series
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	لا يوجد مختبر
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas – Calculus. 4 th edition	Yes
Recommended Texts	Thomas – Calculus. 11 th edition	No
Websites	https://vulms.vu.edu.pk/Courses/MTH101/Downloads/Thomas%20Calculus%2011th%20Edition.pdf	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computer Science		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102026			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGI	Semester of Delivery		Two
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Najlaa Ali Hussein		e-mail	eng.najlaaali.hussein@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	N.A.		e-mail	N.A.
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	–
Co-requisites module	None	Semester	–

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To develop student skills for solving most related mathematical problems in mechanical engineering by MATLAB. 2. To learn how to write a program code and script. 3. To learn how to import and export data. 4. To understand how to construct the matrix and find the matrix indexing and arithmetic. 5. To understand the built-in functions in MATLAB 6. To cover statements in MATLAB that allow other statements to be repeated which are called loops. 7. To learn solving a set of linear equations. 8. To learn coding numerical differentiation and integration. 9. To learn 2D plotting techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students can easily use MATLAB interface and type proper codes or basic commands into the command window. 2. Identify different methods used to construct a matrix and learn how to deal with matrix arithmetic and indexing. 3. Students intended to have the ability of how to write a script and save it and open files. 4. Learning how to convert a string into a number and conversely. 5. Learning how to perform numerical differentiation and integration using symbolic functions. 6. Understanding how a set of linear equations could be solved. 7. Learning the 2D plotting skills by MATLAB.
Indicative Contents المحتويات الإرشادية	- Introduction to MATLAB [5 hrs] - Basic Operations [3 hrs] - Scalar Arithmetic's [3 hrs] - Matrix Construction [5 hrs] - Matrix Indexing [4 hrs] - Matrix Arithmetics [5 hrs] - String manipulation [3 hrs] - Loops and Controls [6 hrs] - Functions [5 hrs] - Differentiations and Integrals in MATLAB [5 hrs] - solving a set of linear equations. [5 hrs] - Figure and Axes [5 hr] - 2D Plotting [5 hrs] - the ezplot family [3 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in programming, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by computer lab.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9, 13	LO #1, 3 and 5
	Assignments	4	10% (10)	3,6,9,12	LO #1-5
	Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 3, 5 and 6
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	LO # 1-6
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to MATLAB
Week 2	Basic Operations
Week 3	Scalar Arithmetics
Week 4	Matrix Construction
Week 5	Matrix Indexing
Week 6	Matrix Arithmetics
Week 7	String manipulation
Week 8	Loops and Controls
Week 9	Functions
Week 10	Differentiations and Integrals in MATLAB
Week 11	Mid-term exam
Week 12	Solving a set of linear equations.
Week 13	Figures and Axes
Week 14	2D Plotting
Week 15	The ezplot family
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to MATLAB
Week 2	Lab 2: Executing the Basic Operations
Week 3	Lab 3: Executing the Scalar Arithmetics
Week 4	Lab 4: Executing the Matrix Construction
Week 5	Lab 5: Executing the Matrix Indexing
Week 6	Lab 6: Executing the Matrix Arithmetics
Week 7	Lab 7: Quiz
Week 8	Lab 8: Executing the String manipulation

Week 9	Lab 9: Executing the Loops and Controls
Week 10	Lab 10: Executing the Differentiations and Integrals in MATLAB by using symbolic function
Week 11	Lab 11: Solving a set of linear equations.
Week 12	Lab 12: Practicing on Figure and Axes
Week 13	Lab 13: Practicing on 2D Plotting
Week 14	Lab 14: Quiz
Week 15	Lab 15: Practicing on the ezplot family

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to MATLAB, California Institute of Technology, ACM11 Spring, 2015.	No
Recommended Texts	MATLAB a Practical introduction to programming and Problem Solving, Stormy Attaway, Boston University, Fourth edition, 2017.	No
Websites	https://www.coursehero.com/file/38467738/Introduction-to-MATLAB-ACM11-Spring-2015-California-Institute-of-Tech/	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Mechanics: statics		Module Delivery	
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102023			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UGI	Semester of Delivery		2
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Dr. Mustafa Baqir Hunain		e-mail	eng.mustafa.baqir@uobabylon.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	PhD
Module Tutor	Dr. Mustafa Baqir Hunain.		e-mail	eng.mustafa.baqir@uobabylon.edu.iq
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	31/05/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- To learn the basic quantities and idealizations of mechanics. 2- To learn expressing forces and position in cartesian vector form and explaining how to determine the vector's magnitude and direction. 3- To learn the concept of the free-body diagram for a particle and rigid body and equilibrium problems. 4- To learn finding moments, couples, and resultants. 5- To analyze the forces in the truss, frames, and machines. 6- To learn finding the centroid of the 1D, 2D, and 3D figures and bodies. 7- To learn the concept of dry friction and how to analyze the equilibrium of rigid bodies subjected to this force such as wedges, screw, and belts. 8- To learn determining the moment of inertia for different 2D shapes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students would have the ability to analyze forces, moments and resultants in 2D and 3D structures. 2. Students would have the ability to draw the free body diagram of any structure. 3. Students intended to have the ability of analyzing the forces in the trusses and frames. 4. Learning how to find the centroid of different shapes and volumes. 5. Learning the types of friction and its applications in the mechanical engineering field. 6. Learning how to find the moment of inertia of different shapes.
Indicative Contents المحتويات الإرشادية	- Basic Concepts, Scalars and Vectors Newton's Laws, Units, and Law of Gravitation [4 hrs] - Force, TWO-DIMENSIONAL FORCE SYSTEMS, Rectangular Components, Moment, Couple, and Resultants [6 hrs] - THREE-DIMENSIONAL FORCE SYSTEMS, Rectangular Components, Moment and Couple, and Resultants [8 hrs] - EQUILIBRIUM IN TWO DIMENSIONS, System Isolation and the Free-Body Diagram, Equilibrium Conditions, EQUILIBRIUM IN THREE DIMENSIONS, and Equilibrium Conditions [8 hrs] - Plane Trusses, Method of Joints, Method of Sections, and Frames and Machines [10 hrs] - CENTERS OF MASS AND CENTROIDS, Center of Mass, Centroids of Lines, Areas, and Volumes Composite Bodies and Figures, and Approximations [8 hrs] - FRICTIONAL PHENOMENA, Types of Friction, Dry Friction, and APPLICATIONS OF FRICTION IN MACHINES, Wedges, Screws, and Flexible Belts [8 hrs]

	- AREA MOMENTS OF INERTIA, Definitions, and Composite Areas [5 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 3, and 4
	Assignments	2	10% (10)	5, 12	LO # 1, 2, 3 and 5
	Projects / Lab.	-	-	-	
	Report	1	10% (10)	13	LO # 5
Summative assessment	Midterm Exam	2 hrs	10% (10)	10	LO # 1-3
	Final Exam	3 hrs	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
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المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic Concepts Scalars and Vectors Newton's Laws Units Law of Gravitation
Week 2	Force TWO-DIMENSIONAL FORCE SYSTEMS Rectangular Components Moment Couple Resultants
Week 3	THREE-DIMENSIONAL FORCE SYSTEMS Rectangular Components Moment and Couple Resultants
Week 4	EQUILIBRIUM IN TWO DIMENSIONS System Isolation and the Free-Body Diagram Equilibrium Conditions
Week 5	EQUILIBRIUM IN THREE DIMENSIONS Equilibrium Conditions
Week 6	Plane Trusses Method of Joints
Week 7	Plane Trusses Method of Sections
Week 8	Frames and Machines
Week 9	FRICTIONAL PHENOMENA Types of Friction Dry Friction
Week 10	Midterm Exam
Week 11	APPLICATIONS OF FRICTION IN MACHINES (Wedges and Screws)
Week 12	APPLICATIONS OF FRICTION IN MACHINES (Flexible Belts)
Week 13	CENTERS OF MASS AND CENTROIDS Center of Mass Centroids of Lines, Areas, and Volumes
Week 14	CENTROIDS of Composite Bodies and Figures; Approximations
Week 15	Definitions of AREA MOMENTS OF INERTIA and AREA MOMENTS OF INERTIA of Composite Areas
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	ENGINEERING MECHANICS-STATICS by J . L . MERIAM and L . G . KRAIGE.	Yes
Recommended Texts	ENGINEERING MECHANICS-STATICS by R. C. Hibbeller	No
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Organic Chemistry		Module Delivery	
Module Type	Basic		☒ Theory Lecture ☒ Lab ☒ Tutorial Practical ☒ Seminar	
Module Code	ENV112			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Basrah Engineering Technical College	
Module Leader	Alya A. Mohammed		e-mail	alayaalrefee@stu.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	AhlamSalihDakhil		e-mail	ahlamzozo207@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	20/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of studying organic chemistry: 1- The student is introduced to organic materials, types of chemical bonds, and orbitals. 2- Identify the active groups present in each type of organic compound. 3- Identifying the physical and chemical properties of organic compounds. 4- Know the methods of analysis of organic materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Know the types of chemical bonds that bind organic compounds and the types of orbitals. 2- Knowing the types of organic compounds and distinguishing between them through knowing the active groups in each type. 3- Knowledge of the physical and chemical properties of organic compounds. 4- Detection of organic functional groups using IR and UV. 5- Being able to measure the melting point and boiling point laboratory. 6- Learn the technique of purifying an organic substance and separating a mixture of several chemicals.
Indicative Contents المحتويات الإرشادية	Organic chemistry, bonds, dipolar couple type of hybridization, orbitals. Hydrocarbon: alkanes, formulation-Hydrocarbons-saturated.Alkene.Acetylene. Aromatic hydrocarbon. Halogen compounds.Ethers. Alcohols. Phenols. Amines, derivatives of amine, diazoniemsats. Aldehydes and ketones. Carboxylic acids .Esters. Amide. Cyclic compounds, Detection of organic functional groups using IR and UV. Practical organic chemistry physical properties of liquid and solid organic compounds, normal distillation and partial distillation. Preparatory week before the final Exam

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the practical experiments that engaged with chemical material while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive in laboratory and by considering types of simple experiments .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2, 4, 6, 8	LO #3, #4 and #6, #7
	Projects / Lab.	10	10% (10)	Continuous	All
	Report	5	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1.5hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Organic chemistry, bonds, dipolar couple type of hybridization, orbitals.
Week 2	Hydrocarbon: alkanes, formulation-Hydrocarbons-saturated.
Week 3	Alkene.
Week 4	Acetylene.
Week 5	Aromatic hydrocarbon.
Week 6	Aromatic hydrocarbon. Midterm Exam + Halogen compounds
Week 7	
Week 8	Ethers. Alcohols. Phenols. Amines, derivatives of amine, diazonium salts.
Week 9	
Week 10	Aldehydes and ketones.
Week 11	Carboxylic acids
Week 12	Carboxylic acids

Week 13	Amide.
Week 14	Cyclic compounds, Detection of organic functional groups using IR and UV. Practical organic chemistry physical properties of liquid and solid organic compounds, normal distillation and partial distillation.
Week 15	
Week 16	Preparation for Final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction of glasses and devices and material in lap
Week 2	Melting point
Week 3	Boiling point
Week 4	Extraction
Week 5	Crystallization
Week 6	Filtration
Week 7	Distillation simple
Week 8	Midterm exam
Week 9	Distillation fraction
Week 10	Preparation of Methane
Week 11	Preparation of Ethylene
Week 12	Preparation of Acetylene
Week 13	Preparation for final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Morrison & Boyd, Organic Chemistry, Prentice Hall	yes
Recommended Texts	1-Bahl & Bahl, Advanced Organic Chemistry	yes
Websites		

Grading Scheme

مخطط الدرجات

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

Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Arabic Language		Module Delivery
Module Type	Basic learning activity		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBABb2		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester of Delivery	
Administering Department	CBM-ENG	College	MAT-ENG
Module Leader	Hiba Mohammed Sagban	e-mail	eng730.hiba.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	Module Leader's Qualification	Master
Module Tutor	None	e-mail	None
Peer Reviewer Name	Prof. Samir Hamid Awad	e-mail	mat.samir.hamid@uobabylon.edu.iq
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- تقوية القدرة اللغوية لدى الطلبة. 2- اكتسابهم مهارة التعبير الصحيح. 3- تعويد الطلاب على فهم المادة المقروءة؛ والتعبير الصحيح. 4- تنمية قدرات الطلاب ومهاراتهم الخطية والاملائية فضلاً عن اطلاعه على الارث الادبي. 5- تنمية قدرات الطلاب ومهاراتهم الفكرية والابداعية والقدرة على التعبير عن الواقع بأسلوب ادبي رفيع.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	مخرجات المعرفة المستهدفة مخرجات المهارة المستهدفة 1- فهم لغة القرآن الكريم. 2- القدرة على التعبير الصحيح في لغته الام وهي اللغة العربية. 3- زيادة حصيلة الطالب الثقافية عن طريق التعرف على التراث الادبي. 4- يجنبه درس اللغة العربية من الوقوع في الاخطاء الاملائية. 5- القدرة على فهم علامات تعبيرية اخرى لها دلالات خاصة كعلامات الترقيم.
Indicative Contents المحتويات الإرشادية	1- معرفة أقسام الكلام في اللغة العربية. 2- التعرف على خصائص اللغة العربية ومميزاتها. 3- ضبط الرسم الاملائي للهمزة وألف التفريق والضاد والطاء. 4- دراسة الادب الحديث وأساليبه تأثره بالاداب القديمة العربية والعالمية 5- تنمية قدرة الطلبة على التعبير الابداعي ونقد الواقع بطريقة ادبية.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	يتم اتباع اسلوب المناقشة، وطريقة المحاضرة. علاوة على الطريقة الاستنتاجية من خلال طرح المشكلات واستنتاج الحلول. بالإضافة الى الطريقة القياسية المبنية على طرح قاعدة عامة واعطاء الامثلة.
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Student Workload (SWL)

الحمل الدراسي للطلاب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4, 8	LO # All
	Assignments	1	10% (10)	6, 12	LO # All
	Seminars	1	10% (10)	15	LO # All
	Report	1	10% (10)	10	LO # 2,3,4, and 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المناهج الاسبوعي النظري	
	Material Covered
Week 1	خصائص اللغة العربية
Week 2	إملاء رسم الهمزة
Week 3	إملاء (ألف التفريق) وعلامات الرقيم
Week 4	اخطاء لغوية شائعة
Week 5	أدب حديث
Week 6	أقسام الكلام
Week 7	العدد
Week 8	اسماء الاستفهام ودلالاتها
Week 9	مقالة
Week 10	المفرد والتثنية والجمع
Week 11	المذكر السالم
Week 12	المؤنث السالم
Week 13	جمع التكسير
Week 14	مادة اختيارية
Week 15	أختياري
Week 16	اسبوع تهيئة لامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	شرح ابن عقيل على ألفية ابن مالك المؤلف : ابن عقيل ، عبد الله بن عبد الرحمن العقيلي.	None
Recommended Texts	معاني النحو المؤلف: د. فاضل صالح السامرائي الناشر: دار الفكر للطباعة والنشر والتوزيع - الأردن جامع الدروس العربية المؤلف: مصطفى بن محمد سليم الغلاييني (ت ١٣٦٤هـ) الناشر: المكتبة العصرية، صيدا - بيروت. مغني اللبيب عن كتب الأعراب، المؤلف: ابن هشام (ت ٧٦١هـ)، المحقق: د. مازن المبارك / محمد علي حمد الله/ الناشر: دار الفكر - دمشق	None
Websites	https://shamela.ws/ https://www.neelwafurat.com/ https://www.noor-book.com/ http://mohamedrabeea.net/list.aspx?bookId=75	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Mechanics: Dynamics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2303		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Qasim Hassen Bader	e-mail	eng.qasim.hassen@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Qasim Hassen Bader	e-mail	eng.qasim.hassen@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	The primary purpose of the study of engineering mechanics is to develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering one of the primary objectives in a mechanics course is to help the student develop this ability to visualize , which is so vital to problem formulation. the students must know : 1- the difference between static and dynamic carefully. 2- The drawing free body diagram and formulating governing equation. 3- Understanding the differences between particle and rigid body. 4- Understanding the difference between kinetic and kinematic 5- The student must know the method required to solving dynamic problem from the system and the related information. 6- The student must know all types of coordinates which may be using to solve the dynamic problems, and for particle or rigid bodies and for both plane motion or motion in space. 7- At the end of the course, the students must know the way to calculate all dynamic forces which may be resulted from the motion of the system
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In general, potential learning outcomes: 1. Students will be able to analyze mechanical systems and identify displacement, velocity and acceleration. 2. Students will be able to recognize the best way to solve dynamic problems. 3. For any kind of motion, the students will be able to draw free body diagram, formulate governing equations, calculate all related forces and motion parameters. 4. Students must be knowing all branches of dynamics and recognize the difference between kinetics and kinematics. 5. Students should be knowing when we can assume the objects as a particle and when we assume it's as rigid body. 6. The student must know the relative motion and the differences with absolute motion. 7. The student must know how to calculate the mass moment of inertia. 8. The student must know the meaning of rigid body motion . 9. The students have a knowledge about the analyzing the force , mass and acceleration of rigid bodies.
Indicative Contents المحتويات الإرشادية	1) Rectilinear motion. (2 hrs) 2) Curvilinear motion, x-y coordinates. (2hrs) 3) Normal and tangential coordinates. (2hrs) 4) Polar coordinates. (3 hrs) 5) Force /mass/acceleration for particles. (3hrs) 6) Rectilinear motion/kinetics. (4hrs) 7) Introduction to kinetics analysis. (3hrs) 8) Work and Energy for particles ,curvilinear motion/kinetics. (4hrs) 9) Impulse and Momentum for particles.(3hrs) 10) Introduction to Rigid body motion.(3hrs) 11) Rigid body motion. (4hrs) 12) Rigid body motion. (3hrs) 13) Mid-term exam & Relative motion. (4hrs) 14) Mass moment of inertia.(4hrs) 15) Force/ mass/acceleration of rigid bodies. (3hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills, by exercises and exam all these points will be achieved.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	6% (12)	6 & 12	LO # 1-3, 4-5
	Assignments	2	4% (8)	6 & 12	LO # 1-3, 4-5
	project	1	10% (10)	13	LO#1-5
	Report	1	10% (10)	14	LO # 1-6
Summative assessment	Midterm Exam	2 hrs	10% (10)	13	LO # 1-5
	Final Exam	3 hrs	50% (50)	16	LO # 1-9
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Rectilinear motion
Week 2	Curvilinear motion, x-y coordinates
Week 3	Normal and tangential coordinates

Week 4	Polar coordinates
Week 5	Force /mass/acceleration for particles
Week 6	Rectilinear motion/kinetics
Week 7	Introduction to kinetics analysis.
Week 8	Work and Energy for particles ,curvilinear motion/kinetics
Week 9	Impulse and Momentum for particles
Week 10	Introduction to Rigid body motion
Week 11	Rigid body motion
Week 12	Rigid body motion
Week 13	Mid-term exam & Relative motion
Week 14	Mass moment of inertia
Week 15	Force/ mass/acceleration of rigid bodies
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics , J.L. Meriam & L.G. Kraige	yes
Recommended Texts	Engineering mechanics, dynamics by Archie Higdon	No
Websites		

Grading Scheme

مخطط الدرجات

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Fluid Mechanics		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MECH2304			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGII	Semester of Delivery		3
Administering Department	Mechanical Engineering	College	Type College Code	
Module Leader	Dr. Alaa Abbas Mahdi		e-mail	eng.alaa.abbas@uobabylon.edu.iq
Module Leader's Acad. Title	Prof.	Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Alaa Abbas Mahdi		e-mail	eng.alaa.abbas@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	2.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester
Co-requisites module	None		Semester

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The objective of this course is to provide an elementary, but rigorous mathematical presentation of continuum description, to introduce concepts and basic principles of fluid mechanics. In particular, the aim is to introduce tensors and elements of tensor algebra, governing equations, and their

	application to modelling and solution of representative fluid mechanical problems relevant to industry and environment, to show various mathematical approaches and assumptions commonly used in the analysis of liquid flows. The module has been developed for students who have little or no experience in fluid mechanics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module students are expected to be able to: 1- Solve hydrostatic problems. 2- Describe the physical properties of a fluid. 3- Calculate the pressure distribution for incompressible fluids. 4- Calculate the hydrostatic pressure and force on plane and curved surfaces. 5- Demonstrate the application point of hydrostatic forces on plane and curved surfaces. 6- Formulate the problems on buoyancy and solve them. 7- Describe the principles of motion for fluids and describe the areas of velocity and acceleration. 8- Formulate the motion of fluid element. 9- Identify derivation of basic equations of fluid mechanics and identify how to derive basic equations and know the related assumptions. 10- Apply the equation of the conservation of mass, apply the equation of the conservation of momentum and apply the equation of the conservation of energy. 11- Make dimensional analysis and similitude and use the dimensional analysis and derive the dimensionless numbers
Indicative Contents المحتويات الإرشادية	Fluid properties (density, viscosity, surface tension) (2 hr) Hydrostatics (forces on surfaces, submerged bodies, valves, gates etc) (3hr) Buoyancy (stability of submerged and floating bodies) (3 hr) Fluid kinematics (streamlines and continuity) (3hr) Fluid dynamics (Bernoulli's equation, flow through orifices, venturi meter) (3 hr) Momentum equation (impacting jets, forces on pipe bend) (3hr) Internal pipe flow: Laminar flow Introduction to Reynolds number (3hr) Poiseuille flow in a pipe and related friction factor (3hr) Turbulent flow Description of turbulent flow characteristics (3 hr) Friction factors and pressure gradients in pipes (3hr) (effect of roughness; Moody chart) Flow development and entrance length (3hr)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6,9	LO #1-6, LO# 7-10
	Assignments	2	10% (10)	6,9	LO #1-6, LO# 7-10
	Lab.	1	10% (10)	1-15	LO # 1-11
	Report	1	10% (10)	11	LO # 1-10
Summative assessment	Midterm Exam	2 hrs	10% (10)	10	LO # 1-10
	Final Exam	3 hrs	50% (50)	16	LO # 1-11
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: Basic concepts of fluid mechanics.
Week 2	Euler's equation of fluid
Week 3	Fundamental terms. Physical values. Fluids and their properties.
Week 4	Forces inside fluid. Fluid Statics: Pascal's law. statics.
Week 5	Measurement of pressure.
Week 6	Relative statics of fluid – constant acceleration, rotation. Forces of hydrostatic pressure. Buoyancy. Flotation. Stability.
Week 7	Fluid Kinematics: Euler and Lagrangian specification of fluid flow. Streamlines. Path lines. Stream surface. Stream tube
Week 8	Mass/volume flow. Control volume. Fluid Dynamics: Continuity equation. Basic laws of fluid dynamics – conservation of mass, conservation of linear momentum, conservation of energy
Week 9	Ideal fluid flow. Application of Bernoulli's equation.
Week 10	Midterm Exam Real fluid flow. Viscosity.
Week 11	Determination of losses.
Week 12	Reynolds experiment. Laminar and turbulent flow. Boundary layer. Velocity profile
Week 13	Losses in pipes. Frictional losses. Nikuradse experiments. Moody's diagram. Local losses. Coefficients of resistance.
Week 14	Definitions of AREA MOMENTS OF INERTIA Hydraulic design of pipeline: Different approaches in designing the pipeline – pressure drop, mass/volume flow, diameter of pipeline. Graphical view. Energy properties of pumps and hydraulic machines.
Week 15	Dimensional analysis. Theory of similarity. Flow of fluid in open channels. Non-stationary flow and hydraulic shock.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Measurement of viscosity (theory)
Week 2	Measurement of viscosity
Week 3	Pressure measurement (theory)

Week 4	Pressure measurement
Week 5	Metacenter height (theory)
Week 6	Metacenter height
Week 7	Bernoulli's Theorem Demonstration (theory)
Week 8	Bernoulli's Theorem
Week 9	Impact of jet
Week 10	Flow through sharp Edge orifice (theory)
Week 11	Flow through sharp Edge orifice
Week 12	Measuring critical Reynolds number in pipe flow (theory)
Week 13	Measuring critical Reynolds number in pipe flow
Week 14	Measuring the Discharge Through small orifice
Week 15	Measuring the velocity coefficient through small orifice

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	“ Fundamentals of Fluid Mechanics “ Munson , Young , Okiishi , Huebsch Sixth Edition , 2009	NO
Recommended Texts	“ Introduction to Fluid Mechanics” Fox and McDonalds Eight Edition , 2011 “Mechanics of Fluids “ , 8th Edition , B.Massey , 2006	No yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics III		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2301		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Ahmed Kadhim Hussein		e-mail
Module Leader's Acad. Title	Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Ahmed Kadhim Hussein		e-mail
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة	1) This module aims to reinforce students 'previous knowledge and to develop new basic mathematical techniques needed to support the engineering subjects that will take in the next levels of study.

الدراسية	2) It also provides knowledge of how the student will solve the mathematical problems of the selected subjects using higher-level thinking skills, including critical thinking and creativity. 3) To encourage students in solving mathematical problems precisely without mistakes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students have knowledge in Simultaneous Equations. 2. Students have knowledge in Linear and Non-Linear Simultaneous Equations. 3. Students are able to solve the Linear and Non-Linear Simultaneous Equations (First and Second Degree). 4. Students are able to solve the Linear and Non-Linear Simultaneous Equations (First and Second Order). 5. Students have knowledge how to solve the Simultaneous Equations using Matrices. 6. Students are able to solve the Ordinary Differential Equations. 7. Students have knowledge about the Functions of Several Variables. 8. Students have knowledge about how to solve the Partial Differential Equations in First and Second Degrees. 9. Students have knowledge about what is the applications of Partial Differential Equations. 10. Students have knowledge about the Complex numbers. 11. Students have knowledge about how to find the results of Exponential and Logarithmic series using Taylor series. 12. Students are able to find the results of the Trigonometric series using Taylor series.
Indicative Contents المحتويات الإرشادية	- Basic Concept of Simultaneous Equations [3 hrs] - Linear and Non-Linear Simultaneous Equations [3 hrs] - First and Second Degree of Linear and Non-Linear Simultaneous Equations [3 hrs] - First and Second Order of Linear and Non-Linear Simultaneous Equations [3 hrs]

	- Basic Concept of Matrices [3 hrs] - Solving the Simultaneous Equations Using Matrices [5 hrs] - Ordinary Differential Equations [6 hrs] - Functions of Several Variables [6 hrs] - Partial Differential Equations of First Degree [8 hrs] - Partial Differential Equations of Second Degree [8 hrs] - Applications of Partial Differential Equations [6 hrs] - Complex Numbers [5 hrs] - Exponential and Logarithmic Series Using Taylor Series [5 hrs] - Trigonometric Series Using Taylor Series [8 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is: 1) To encourage students' participation in solving the mathematical problems in groups during the tutorials. 2) Activate the critical thinking skills of the students. 3) Encourage the students to ask questions in the classes. 4) Encourage the students to introduce home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5, 11	LO # (1-4), (5-8)
	Assignments	2	5% (10)	5,11	LO # (1-4), (5-8)
	Project	1	5% (5)	14	LO # (1-10)
	Report	1	15% (15)	13	LO # (1-10)
Summative assessment	Midterm Exam	2 hr	10% (10)	12	LO # (1-9)
	Final Exam	3 hr	50% (0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Concept of Simultaneous Equations
Week 2	Linear and Non-linear Simultaneous Equations
Week 3	First and Second Degree of Linear Simultaneous Equations
Week 4	First and Second Order of Non-linear Simultaneous Equations
Week 5	Basic Concept of Matrices
Week 6	Solving the Simultaneous Equations using Matrices
Week 7	Ordinary Differential Equations
Week 8	Functions of Several Variables
Week 9	Partial Differential Equations of First Degree
Week 10	Partial Differential Equations of Second Degree
Week 11	Applications of Partial Differential Equations
Week 12	Mid-Term Exam Complex Numbers
Week 13	Exponential Series
Week 14	Logarithmic Series
Week 15	Trigonometric Series
Week 16	Preparatory week before the final exam
Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	

	Material Covered
Week 1	لا يوجد مختبر
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas – Calculus. 4 th edition	Yes
Recommended Texts	Thomas – Calculus. 11 th edition	No
Websites	https://vulms.vu.edu.pk/Courses/MTH101/Downloads/Thomas%20Calculus%2011th%20Edition.pdf	
Recommended Texts	Mathematics-I	No
Websites	https://www.ms.uky.edu/~ejwh226/Spring2018/Chasnov.pdf	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Thermodynamics		Module Delivery
Module Type	Core		- Theory Lecture - Lab - Tutorial - Practical - Seminar
Module Code	MECH2302		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Mechanical Engineering	College	College of engineering
Module Leader	Sawsan Abdulsattar Awadh	e-mail	eng.sawsan.awadh@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Sawsan Abdulsattar Awadh	e-mail	eng.sawsan.awadh@uobabylon.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	2.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	• To cover the basic principles of thermodynamics. • To present a wealth of real-world engineering examples to give students a feel for how thermodynamics is applied in engineering practice. • To develop an intuitive understanding of thermodynamics by emphasizing the physics and physical arguments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) Understand the basic concepts of thermodynamics. 2) Demonstrate the procedures for determining thermodynamic properties of pure substances from tables of property data. 3) Describe the hypothetical substance “ideal gas” and the ideal-gas equation of state. 4) Introduce the first law of thermodynamics, energy balances, and mechanisms of energy transfer to or from a system. 5) Identify the first law of thermodynamics as simply a statement of the conservation of energy principle for closed (fixed mass) systems. 6) Solve energy balance problems for closed (fixed mass) systems that involve heat and work interactions for general pure substances, ideal gases, and incompressible substances. 7) Apply the first law of thermodynamics as the statement of the conservation of energy principle to control volumes. 8) Solve energy balance problems for common steady-flow devices such as nozzles, compressors, turbines, throttling valves, mixers, heaters, and heat exchanges. 9) Introduce the second law of thermodynamics. 10) Apply the second law of thermodynamics to cycles and cyclic devices. 11) Apply the second law to develop the absolute thermodynamic temperature scale. 12) Describe the Carnot cycle. 13) Examine the Carnot principles, idealized Carnot, refrigerators, heat pumps and heat engines. 14) Determine the expressions for the thermal efficiencies and coefficients of performance for reversible refrigerators, , heat pumps heat engines.
Indicative Contents المحتويات الإرشادية	Introduction and basic concepts [5 hr] Have an overview of thermodynamics and the unit systems, and continue with a discussion of some basic concepts such as system, state, state postulate, equilibrium, and process. Recognize temperature and temperature scales with particular emphasis on the International Temperature Scale of 1990. We then present pressure, which is the normal force exerted by a fluid per unit area and discuss absolute and gage pressures, the variation of pressure with depth, and pressure measurement devices, such as manometers and barometers. Careful study of these concepts is essential for a good understanding of the topics in the following chapters. Finally, examine an intuitive systematic problem-solving technique that can be used as a model in solving engineering problems. Revision problem classes Energy, energy transfer, and general energy analysis [8 hr] Recognize the various forms of energy and energy transfer by heat. We then introduce various forms of work and discuss energy transfer by work. Continue with developing a general intuitive expression for the first law of thermodynamics, also known as the conservation of energy principle, which is

one of the most fundamental principles in nature, and then demonstrate its use. Finally, study the efficiencies of some familiar energy conversion processes, and examine the impact on energy conversion on the environment.

Revision problem classes

Properties of pure substances [15 hr]

Understand the concept of a pure substance and a discussion of the physics of phase-change processes. Examine the various property diagrams and P-v-T surfaces of pure substances. Learn how to determine the thermodynamics properties of substances.

After demonstrating the use of the property tables, the hypothetical substance ideal gas and the ideal-gas equation of state. Examine the compressibility factor, which accounts for the deviation of real gases from ideal-gas behavior, and some of the best-known equations of state such as the van der Waals.

Revision problem classes

Energy analysis of closed systems [12 hr]

Understand various forms of energy and energy transfer, and recognize general relation for the conservation of energy principle or energy balance.

Learn how to determine the thermodynamics properties of substances. Apply the energy balance relation to systems that do not involve any mass flow across their boundaries; that is, closed systems. Examine the moving boundary work commonly encountered in reciprocating devices such as automotive engines and compressors. Continue by applying the general energy balance relation to systems that involve pure substance. Then define specific heats, obtain relations for the internal energy and enthalpy of ideal gases in terms of specific heats and temperature changes, and perform energy balances on various systems that involve ideal gases. We repeat this for systems that involve solids and liquids, which are approximated as incompressible substances.

Revision problem classes

Mass and energy analysis of open systems [12 hr]

Study the energy analysis to systems that involve mass flow across their boundaries i.e., control volumes, with particular emphasis to steady-flow systems. Develop of the general *conservation of mass* relation for control volumes, and continue with a discussion of flow work and the energy of fluid streams. Apply the energy balance to systems that involve *steady-flow processes* and analyze the common steady-flow devices such as nozzles, diffusers, compressors, turbines, throttling devices, mixing chambers, and heat exchangers. Finally, apply the energy balance to general *unsteady-flow processes* such as the charging and discharging of vessels.

Revision problem classes

The second Law of Thermodynamics [10 hr]

Examine the second law of thermodynamics, which asserts that processes occur in a certain direction and that energy has quality as well as quantity. A process cannot take place unless it satisfies both the first and second laws of thermodynamics. Recognize the thermal energy reservoirs, reversible and irreversible processes, heat engines, refrigerators, and heat pumps are introduced first. Various statements of the second law are followed by a discussion of perpetual motion machines and the thermodynamic temperature scale. Study the Carnot cycle and the Carnot principles. Finally, examine the idealized Carnot heat engines, refrigerators, and heat pumps.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 12	LO #1-4 and 5-8
	Assignments	1	10% (10)	14	LO # 6-12
	Lab.	1	10% (10)	Continuous	
	Tutorial	1	10% (10)	Continuous	LO #1-14
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction and Basic Concepts
Week 2	Properties of Pure Substances
Week 3	Phase-Change Processes of Pure Substances
Week 4	Property Diagrams for Phase-Change Processes
Week 5	Energy Conversion and General Energy Analysis
Week 6	The First Law of Thermodynamics
Week 7	Mid-term Exam
Week 8	Energy Analysis of Closed Systems
Week 9	Internal Energy, Enthalpy, and Specific Heats of Ideal Gases
Week 10	Internal Energy, Enthalpy, and Specific Heat of Solids and Liquids
Week 11	Mass and Energy Analysis of Control Volumes
Week 12	Energy Analysis of Steady-Flow Systems
Week 13	The Second Law of Thermodynamics
Week 14	Refrigerators and Heat Pumps
Week 15	Heat Engines
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Boyles' law for gases
Week 2	Lab 2: Boyles' law for gases
Week 3	Lab 3: Charles' s law for gases
Week 4	Lab 4: Charles' s law for gases
Week 5	Lab 5: Specific heats for gases
Week 6	Lab 6: Specific heats for gases
Week 7	Lab 7: Temperature measurement
Week 8	Lab 8: Temperature measurement
Week 9	Lab 9: Investigating of the saturation temperature and pressure.
Week 10	Lab 10: Investigating of the saturation temperature and pressure.
Week 11	Lab 11: Heat pumps
Week 12	Lab 12: Heat pumps
Week 13	Lab 13: Refrigerators
Week 14	Lab 14: Refrigerators
Week 15	Lab 15: Heat engine

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Cengel, Yunus A., Michael A. Boles, and Mehmet Kanoğlu. <i>Thermodynamics: an engineering approach..</i> New York: McGraw-hill, 2019.	Yes
Recommended Texts	Singh, Onkar. <i>Applied thermodynamics.</i> New Age International, 2009.	No
Websites	no	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Strength of Materials I		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2305		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering College
Module Leader	Mohammed Jawad Aubad	e-mail	eng.mohammed.j.tarfa@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Mohammed Jawad Aubad	e-mail	eng.mohammed.j.tarfa@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of strength of materials through the applications (bar, rod, pin, shaft, beam, ...) 2. To understand the relation between the stress and strain of materials

	- To understand how to find the normal, tensile, bearing and shear stresses of simple structures - To learn solving and analysis the problems of shafts and power transmission for circular and noncircular sections - To understand how to draw the shear and moment diagram of beams - To learn the design of simple beams
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Student can easily solve any simple structure. - Students intended to have the ability of finding the types of stresses and strain - Students intended to have the ability of finding the shear stress, deformation and power transmission of shafts. - Students intended to have the ability of finding the shear stress of Thin-Walled Tubes Having Closed Cross Sections - Student would have the ability to draw the shear and moment diagrams of beams - Student would have the ability to design the beams - Student would have the ability to design the curved beams - Student would have the ability to design the Thin-Walled Pressure Vessels
Indicative Contents المحتويات الإرشادية	- normal stress [3 hrs] - bearing stress [3 hrs] - shearing stress [3 hrs] - stresses in simple structures [3 hrs] - axially loaded [3 hrs] - Hooke's Law [3 hrs] - Poisson's Ratio [3 hrs] - normal strain(deformation) [3 hrs] - thermal deformation [3 hrs] - Torsional Deformation of a Circular Shaft [3 hrs] - Power Transmission [3 hrs] - Angle of Twist [3 hrs] - Solid Noncircular Shafts [3 hrs] - Thin-Walled Tubes Having Closed Cross Sections [3 hrs] - Shear and Moment Diagrams [3 hrs] - Graphical Method for Constructing Shear and Moment Diagrams [3 hrs] - Bending Deformation of a Straight Member [3 hrs] - Shear in Straight Members [3 hrs] - Shear Flow in Thin-Walled Members [3 hrs] - Curved Beams [2 hrs] - Thin-Walled Pressure Vessels [3 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	16% (16)	6 and 12	LO #1-3 and 4-5
	Assignments	2	8% (8)	6 and 12	LO #1-3 and 4-5
	Lab.	1	10% (10)	Continuous	LO #1-8
	Report	1	6% (6)	15	LO # 1-7
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	LO # 1-8
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction- Equilibrium of a Deformable Body
Week 2	Stress- Average Normal Stress in an Axially Loaded Bar
Week 3	Average Shear Stress+ Allowable Stress
Week 4	Strain- Deformation
Week 5	The Stress–Strain Diagram+ Stress–Strain Behavior of Ductile and Brittle Materials

Week 6	Hooke's Law+ Poisson's Ratio
Week 7	Statically Indeterminate Axially Loaded Member
Week 8	Thermal Stress
Week 9	Torsional Deformation of a Circular Shaft+ The Torsion Formula
Week 10	Power Transmission+ Angle of Twist +Thin-Walled Tubes Having Closed Cross Section
Week 11	Shear and Moment Diagrams- Graphical Method for Constructing Shear and Moment Diagrams
Week 12	The Flexure Formula+ Curved Beams
Week 13	The Shear Formula -Shear Flow in Built-Up Members +Shear Flow in Thin-Walled Members
Week 14	Midterm Exam
Week 15	Thin-Walled Pressure Vessels
Week 16	Preparatory Week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Conducting compressive test
Week 2	Lab 2: Conducting tensile test
Week 3	Lab 3: Conducting Rockwell hardness test
Week 4	Lab 4: Conducting Vickers hardness test
Week 5	Lab 5: Conducting Brinell hardness test
Week 6	Lab 6: Conducting Charpy impact test
Week 7	Lab 7: Conducting Izod impact test
Week 8	Lab 8: Conducting torsion test
Week 9	Lab 9: Conducting bending test
Week 10	Lab 10: Conducting direct shear test
Week 11	Lab 11: Conducting creep test
Week 12	Lab 12: Conducting deflection test on simply supported beam
Week 13	Lab 13: Conducting deflection test on cantilever beam
Week 14	Lab 14: Conducting buckling test
Week 15	Lab 15: Use of electrical resistance strain gauge

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mechanics of Materials, eighth edition R. C. Hibbeler	Yes

Recommended Texts	Engineering Mechanics, Dietmar Gross · Werner Hauger Jörg Schröder · Wolfgang A. Wall and Javier Bonet	No
Websites	https://www. /nuclear-engineering/materials-science/material-properties/strength/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Arabic Language		Module Delivery
Module Type	Basic learning activity		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB2001		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering
Module Leader	Ahmed Sahib Ghali		e-mail
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D
Module Tutor	Ahmed Sahib Ghali		e-mail
Peer Reviewer Name		e-mail	None
Scientific Committee Approval Date		Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- تقوية القدرة اللغوية لدى الطلبة. 2- اكتسابهم مهارة التعبير الصحيح. 3- تعويد الطلاب على فهم المادة المقروءة؛ والتعبير الصحيح.

	4- تنمية قدرات الطلاب ومهاراتهم الخطية والاملائية فضلا عن اطلاقه على الارث الادبي. 5- تنمية قدرات الطلاب ومهاراتهم الفكرية والابداعية والقدرة على التعبير عن الواقع بأسلوب ادبي رفيع.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- معرفة الطالب في كيفية املاي الهمزة. 2- معرفة الطالب عن الهمزة الوسطية والختامية 3- معرفة الطالب عن الكميت شاعر اهل البيت (ع) 4- معرفة الطالب عن كيفية إملاء (ألف التفريق) وعلامات الترقيم. 5- معرفة الطالب عن العدد كتابة ولفظا. 6- معرفة الطالب حول أدب حديث (الجواهري انموذجا). 7- تعلم الطالب عن الاستثناء. 8- معرفة الطالب عن الشعر الحر (احمد مطر انموذجا). 9- الطالب سيتعلم عن كيفية صياغة موضوع النداء. 10- سيتعرف الطالب عن كيفية التمييز بين النكرة والمعرفة. 11- تعرف الطالب عن شخصية وقصائد الفرزدق شاعر اهل البيت (ع) . 12- معرفة الطالب عن موضوع نصب الفعل المضارع. 13- التعرف على شخصية ومؤلفات شاعر العراق بدر شاكر السياب. 14- التعرف على الألف المقصورة والالف الممدودة.
Indicative Contents المحتويات الإرشادية	1- معرفة الطالب في كيفية املاي الهمزة. (1 ساعة) 2- معرفة الطالب عن الهمزة الوسطية والختامية. (1 ساعة) 3- معرفة الطالب عن الكميت شاعر اهل البيت (ع). (1 ساعة) 4- معرفة الطالب عن كيفية إملاء (ألف التفريق) وعلامات الترقيم. (1 ساعة) 5- معرفة الطالب عن العدد كتابة ولفظا. (2 ساعة) 6- معرفة الطالب حول أدب حديث (الجواهري انموذجا). (2 ساعة) 7- تعلم الطالب عن الاستثناء. (1 ساعة) 8- معرفة الطالب عن الشعر الحر (احمد مطر انموذجا). (1 ساعة) 9- الطالب سيتعلم عن كيفية صياغة موضوع النداء. (1 ساعة) 10- سيتعرف الطالب عن كيفية التمييز بين النكرة والمعرفة. (1 ساعة) 11- تعرف الطالب عن شخصية وقصائد الفرزدق شاعر اهل البيت (ع) . (2 ساعة) 12- معرفة الطالب عن موضوع نصب الفعل المضارع. (1 ساعة) 13- التعرف على شخصية ومؤلفات شاعر العراق بدر شاكر السياب. (1 ساعة) 14- التعرف على الألف المقصورة والالف الممدودة. (1 ساعة)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	يتم اتباع اسلوب المناقشة، وطريقة المحاضرة. علاوة على الطريقة الاستنتاجية من خلال طرح المشكلات واستنتاج الحلول. بالإضافة الى الطريقة القياسية المبنية على طرح قاعدة عامة واعطاء الامثلة.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2
الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem)	50		
الحمل الدراسي الكلي للطلاب خلال الفصل			

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (5+5)	5, 12	LO # 1-4, 5-11
	Assignments	2	10% (5+5)	5, 12	LO # 1-4, 5-11
	Projects /Seminars	1	10% (10)	continuous	LO # 1-14
	Report	1	10% (10)	14	LO # 1-12
Summative assessment	Midterm Exam	2 hr	10% (10)	13	LO # 1-12
	Final Exam	3 hr	50% (50)	16	LO # 1-14
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	املاء رسم الهمزة
Week 2	الهمزة الوسطية والختامية
Week 3	الكميت شاعر اهل البيت (ع)
Week 4	إملاء (ألف التفريق) وعلامات الترقيم
Week 5	العدد
Week 6	أدب حديث (الجواهري انموذجا)
Week 7	الاستثناء
Week 8	الشعر الحر (احمد مطر انموذجا)
Week 9	النداء
Week 10	النكرة والمعرفة
Week 11	الفرزدق شاعر اهل البيت (ع)
Week 12	نصب الفعل المضارع
Week 13	الامتحان الفصلي
Week 14	بدر شاكر السياب (شاعر العراق)
Week 15	الألف المقصورة والألف الممدودة
Week 16	اسبوع تهيئة لامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	شرح ابن عقيل على ألفية ابن مالك المؤلف : ابن عقيل ، عبد الله بن عبد الرحمن العقيلي.	None
Recommended Texts	معاني النحو المؤلف: د. فاضل صالح السامرائي الناشر: دار الفكر للطباعة والنشر والتوزيع - الأردن جامع الدروس العربية المؤلف: مصطفى بن محمد سليم الغلاييني (ت ١٣٦٤هـ) الناشر: المكتبة العصرية، صيدا - بيروت. مغني اللبيب عن كتب الأعاريب، المؤلف: ابن هشام (ت ٧٦١هـ)، المحقق: د. مازن المبارك / محمد علي حمد الله/ الناشر: دار الفكر - دمشق	None
Websites	https://shamela.ws/ https://www.neelwafurat.com/ https://www.noor-book.com/ http://mohamedrabeea.net/list.aspx?bookId=75	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Baath Party Crimes		Module Delivery	
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB2301			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGII	Semester of Delivery		3
Administering Department	Mechanical Engineering	College	College of engineering	
Module Leader	Ruqaya Ali Abdel Zahra		e-mail	Bas508.rqyh.ali@uobabylon.edu.iq Ruqaiali75@gmail.com
Module Leader's Acad. Title	Assistant teacher	Module Leader's Qualification	A.T	
Module Tutor	Ruqaya Ali Abdel Zahra		e-mail	Bas508.rqyh.ali@uobabylon.edu.iq Ruqaiali75@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	تهدف مادة جرائم النظام البعثي الى كشف حقيقة النظام البعثي ليتمكن الشباب الجامعي من رؤية العقود من حكم العراق بيد طاغية شيطان فيذكرون بمعرفتهم محتويات المادة مما يضعهم على الطريق الصحيح لدر كل تضليل اعلامي يحاول تضليلهم .

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	(1) التعرف على الجرائم التي ارتكبتها نظام البعث التي تدرج ضمن القضايا الدولية. (2) تعريف الطلاب بأبرز انتهاكات القوانين العراقية. (3) التعرف على انواع الجرائم النفسية والاجتماعية والبيئية والسياسية التي ارتكبتها نظام البعث. (4) تعريف الطلاب بأبرز انتهاكات القوانين العراقية . (5) الوقوف على حقائق هذا النظام الجائر وتبصر هذا الجيل . (6) ان يكون المتعلم قادر على الامثلة على تلك الجرائم وامكان حدوثها (7) ان يعرف الطالب الاثار الاجتماعية والنفسية للجرائم التي ارتكبتها (8) ان يعرف الطالب مدى خطورة الجرائم على البيئة مثل حرق البساتين وتجفيف الالهوار وغيرها . (9) ان يعرف الطالب المقابر التي خلفها النظام البائد مع تحديد موقعها ومكان حدوثها (10) يتعرف على الاثار السلبية الناجمة من عسكرة المجتمع (11) يبين امكان السجون السرية والمعتقلات الخاصة التي كانت يسجن فيها المعارضون للنظام (12) يوضح الطالب ابرز المناطق التي تعرضت للتلوث الحربي والاشعاعي (13) يصنف المقابر الجماعية التي ارتكبتها نظام البعث في العراق (14) يعرض اهم احداث مجزرة الاثار .
Indicative Contents المحتويات الإرشادية	1- مفهوم الجرائم واقسامها (1 ساعة) 2- جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية لعام 2005. (1 ساعة) 3- عسكرة المجتمع. (1 ساعة) 4- موقف نظام البعث من الدين وانتهاكاته للقوانين العراقية. (1 ساعة) 5- بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث الدائم. (1 ساعة) 6- امكان السجون والاحتجاز لنظام البعث في العراق. (1 ساعة) 7- الجرائم البيئية لنظام البعث / (1) التلوث الحربي والاشعاعي وانفجار الالغام (1 ساعة) 8- (2) تدمير المدن والقرى (سياسة الارض المحروقة). (1 ساعة) 9- تجفيف الالهوار في جنوب العراق وتجريف البساتين والنخل والاشجار والمزروعات. (1 ساعة) 10- جرائم المقابر الجماعية. (1 ساعة) 11- احداث عام 1963 وعلاقتها بالمقابر الجماعية. (1 ساعة) 12- (1) احداث عام 1979 الى 1988 وعلاقتها بالمقابر الجماعية (2) احداث عام 1987 الى 1988 وعلاقتها بالمقابر الجماعية. (2 ساعة) 13- احداث الانتفاضة الشعبانية عام 1991 وعلاقتها بالمقابر الجماعية. (2 ساعة) 14- (1) التصنيف الزمني للمقابر الجماعية والابادة الجماعية في العراق 1963 الى 2003. (2) المقابر الجماعية ضد الاكراد 1983 (3) مجزرة الانفال. (2 ساعة)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الاستراتيجية الرئيسية المعتمدة في تقديم هذه الوحدة هي مشاركة الطلبة في المادة من خلال طرح بعض الاسئلة ومناقشتها معهم وكذلك طرح اسئلة تفاعلية بحيث يستطيع الطالب المشاركة والتفاعل وتقديم وجهة نظره في المادة .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	7% (14)	5, 10	1-4, 5-9
	Assignments	1	10%(10)	5, 10	1-4, 5-9
	Projects	1	6%(6)	12	10-12
	Report	1	10%(10)	15	1-13
Summative assessment	Midterm Exam	2 hr	10% (10)	13	1-12
	Final Exam	3 hr	50% (50)	16	1-14
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	مفهوم الجرائم واقسامها
Week 2	جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية لعام 2005
Week 3	عسكرة المجتمع
Week 4	موقف نظام البعث من الدين وانتهاكاته للقوانين العراقية
Week 5	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث الدائم
Week 6	اماكن السجون والاحتجاز لنظام البعث في العراق

Week 7	الجرائم البيئية لنظام البعث 1/ التلوث الحربي والاشعاعي وانفجار الانغام
Week 8	2 تدمير المدن والقرى (سياسة الارض المحروقة)
Week 9	تجفيف الاهوار في جنوب العراق وتجريف البساتين والنخل والاشجار والمزروعات
Week 10	جرائم المقابر الجماعية
Week 11	احداث عام 1963 وعلاقتها بالمقابر الجماعية
Week 12	1 احداث عام 1979 الى 1988 وعلاقتها بالمقابر الجماعية 2 احداث عام 1987 الى 1988 وعلاقتها بالمقابر الجماعية
Week 13	Mid-Exam
Week 14	احداث الانتفاضة الشعبانية عام 1991 وعلاقتها بالمقابر الجماعية
Week 15	التصنيف الزمني للمقابر الجماعية والابادة الجماعية في العراق 1963 الى 2003 المقابر الجماعية ضد الاكراد 1983 مجزرة الانفال
Week 16	Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. جرائم حزب البعث	No
Recommended Texts	-	
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Applied Thermodynamics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2402		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of engineering
Module Leader	Sawsan Abdulsattar Awadh	e-mail	eng.sawsan.awadh@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Sawsan Abdulsattar Awadh	e-mail	eng.sawsan.awadh@uobabylon.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Thermodynamics UOBAB0102033	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	• To cover the basic principles of thermodynamics. • To present a wealth of real-world engineering examples to give students a feel for how thermodynamics is applied in engineering practice. • To develop an intuitive understanding of thermodynamics by emphasizing the physics and physical arguments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) Apply the second law of thermodynamics to processes. 2) Study a new property called entropy to quantify the second-law effects. 3) Establish the increase of entropy principle. 4) Calculate the entropy changes that take place during processes for pure substances, incompressible substances, and ideal gases. 5) Examine a special class of idealized processes, called isentropic processes, and develop the property relations for these processes. 6) Derive the reversible steady-flow work relations. 7) Develop the isentropic efficiencies for various steady-flow devices. 8) Apply the entropy balance to various systems. 9) Evaluate the performance of gas power cycles for which the working fluid remains a gas throughout the entire cycle. 10) Develop simplifying assumptions applicable to gas power cycles. 11) Review the operation of reciprocating engines. 12) Analyze both closed and open gas power cycles. 13) Solve problems based on the Otto and Diesel engines. 14) Solve problems based on the Brayton cycle; the Brayton cycle with regeneration; and the Brayton cycle with intercooling, reheating, and regeneration. 15) Identify simplifying assumptions for second-law analysis of gas power cycles. 16) Perform second-law analysis of gas power cycles. 17) Analyze vapor power cycles in which the working fluid is alternately vaporized and condensed. 18) Investigate ways to modify the basic Rankine vapor power cycle to increase the cycle thermal efficiency. 19) Analyze the reheat and regenerative vapor power cycles. 20) Analyze power cycles that consist of two separate cycles known as combined cycles and binary cycles. 21) Introduce the concepts of refrigerators and heat pumps and the measure of their performance. 22) Analyze the ideal vapor-compression refrigeration cycle. 23) Analyze the actual vapor-compression refrigeration cycle. 24) Review the factors involved in selecting the right refrigerant for an application. 25) Discuss the operation of refrigeration and heat pump systems. 26) Evaluate the performance of innovative vapor-compression refrigeration systems. 27) Analyze gas refrigeration systems. 28) Introduce the concepts of absorption-refrigeration systems. 29) Review the concepts of thermoelectric power generation and refrigeration. 30) Develop rules for determining nonreacting gas mixture properties from knowledge of mixture composition and the properties of the individual components. 31) Define the quantities used to describe the composition of a mixture, such as mass fraction, mole fraction, and volume fraction. 32) Apply the rules for determining mixture properties to ideal gas mixtures and real-gas mixtures. 33) Predict the P-v-T behavior of gas mixtures based on Dalton's law of

	additive pressures and Amagat's law of additive volumes.
Indicative Contents المحتويات الإرشادية	Entropy [10 hr] Apply the second law to processes. The second law leads to the definition of a new property called entropy. Entropy is a somewhat abstract property, and it is difficult to give a physical description of it without considering the microscopic state of the system. Recognize the Clausius inequality, which forms the basis for the definition of entropy, and continues with the increase of entropy principle. Next, examine the entropy changes that take place during processes for pure substances, incompressible substances, and ideal gases and a special class of idealized processes, called isentropic processes. Then, consider the reversible steady-flow work and the isentropic efficiencies of various engineering devices such as turbines and compressors. Revision problem classes Gas power cycles [15 hr] Evaluate the performance of gas power cycles for which the working fluid remains a gas throughout the entire cycle. Develop simplifying assumptions applicable to gas power cycles. Review the operation of reciprocating engines. Analyze both closed and open gas power cycles. Solve problems based on the Otto and Diesel engines. Solve problems based on the Brayton cycle; the Brayton cycle with regeneration; and the Brayton cycle with intercooling, reheating, and regeneration. Identify simplifying assumptions for second-law analysis of gas power cycles. Perform second-law analysis of gas power cycles. Revision problem classes Vapour and combined power cycles [15 hr] Consider <i>vapor power cycles</i> in which the working fluid is alternatively vaporized and condensed. The continued quest for higher thermal efficiencies has resulted in some innovative modifications to the basic vapor power cycle. Among these, we discuss the <i>reheat</i> and <i>regenerative cycles</i>, as well as combined gas–vapor power cycles. Steam is the most common working fluid used in vapour power cycles because of its many desirable characteristics, such as low cost, availability, and high enthalpy of vaporization Revision problem classes Refrigeration cycles [12 hr] Study the vapor-compression refrigeration cycle in which the refrigerant is vaporized and condensed alternately and is compressed in the vapor phase. Also, the gas refrigeration cycle in which the refrigerant remains in the gaseous phase throughout. Revision problem Gas mixtures [10 hr] A nonreacting gas mixture can be treated as a pure substance since it is usually a homogeneous mixture of different gases. The properties of a gas mixture obviously depend on the properties of the individual gases (called components or constituents) as well as on the amount of each gas in the mixture. Therefore, it is possible to prepare tables of properties for mixtures. This has been done for common mixtures such as air. It is not practical to prepare property tables

	for every conceivable mixture composition, however, since the number of possible compositions is endless. Therefore, we need to develop rules for determining mixture properties from a knowledge of mixture composition and the properties of the individual components. We do this first for ideal-gas mixtures and then for real-gas mixtures. The basic principles involved are also applicable to liquid or solid mixtures, called solutions. Revision problem classes
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-15 and 16-25
	Assignments	2	10% (10)	2, 12	LO # 3-8 and 10-20
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO# 1-18
Summative assessment	Midterm Exam	2 hrs	10% (10)	9	LO # 1-16
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Entropy Change of Pure Substances
Week 2	Isentropic Processes
Week 3	The Entropy Change of Ideal Gases
Week 4	Isentropic Efficiencies of Steady-Flow Devices
Week 5	The Carnot Cycle and Its Value in Engineering
Week 6	Brayton Cycle: The Ideal Cycle for Gas-Turbine Engines
Week 7	Otto Cycle: The Ideal Cycle for Spark-Ignition Engines
Week 8	Diesel Cycle: The Ideal Cycle for Compression-Ignition Engines
Week 9	Mid term exam
Week 10	The Carnot Vapor Cycle
Week 11	Energy Analysis of the Ideal Rankine Cycle
Week 12	How Can We Increase the Efficiency of the Rankine Cycle?
Week 13	The Ideal Reheat Rankine Cycle
Week 14	Refrigerators and Heat Pumps
Week 15	P-v-T Behavior of Gas Mixtures: Ideal and Real Gases
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Diesel engine
Week 2	Lab 2: Compression ratio of Diesel engine
Week 3	Lab 3: petrol engine
Week 4	Lab 4: Compression ratio of petrol engine
Week 5	Lab 5: Steam turbine
Week 6	Lab 6: Steam turbine
Week 7	Lab 7: Gas turbine
Week 8	Lab 8: Gas turbine
Week 9	Lab 9: Coefficient of performance of Refrigerator
Week 10	Lab 10: Coefficient of performance of Refrigerator

Week 11	Lab 11: Coefficient of performance of heat pump
Week 12	Lab 12: Coefficient of performance of heat pump
Week 13	Lab 13: Cooling tower
Week 14	Lab 14: Cooling tower
Week 15	Lab 15: Dalton law for gas mixtures

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Cengel, Yunus A., Michael A. Boles, and Mehmet Kanoğlu. <i>Thermodynamics: an engineering approach..</i> New York: McGraw-hill, 2019.	Yes
Recommended Texts	Singh, Onkar. <i>Applied thermodynamics.</i> New Age International, 2009.	No
Websites	no	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Statistics		Module Delivery	
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MECH2401			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGI	Semester of Delivery		One
Administering Department	Mechanical Engineering	College	College of Engineering	
Module Leader	Basil Mahdi Hadi Al-Srayyih		e-mail	eng.basilm.hadi@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Basil Mahdi Hadi Al-Srayyih		e-mail	eng.basilm.hadi@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics II (UOBAB0102021)	Semester	2
		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة	1) This module aims to teach engineering students about the concept of statistics and how to describe and analyse data sets, represent them numerically, and apply them graphically in MATLAB program.

الدراسية	2) The basic idea behind all the statistical methods of data analysis is to make inferences about the results of a given data.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students have knowledge in how the data summaries graphically. 2. Students have knowledge to find the results for the mean, median and standard deviation for a given data. 3. Students are able to find a local value and distinguish the outliers. 4. Students are able to find the probability using the Counting Rules. 5. Students have knowledge about how to calculate the expectation and variance of a discrete random variable for the Binomial probability distributions. 6. Students have knowledge about how to calculate the expectation and variance of a discrete random variable for the Poisson probability distributions. 7. Students have knowledge about how to determine the expectation and variance of a continuous random variable for the uniform probability distributions. 8. Students have knowledge about how to determine the expectation and variance of a continuous random variable for the exponential probability distributions. 9. Students are able to explore relationships between variables. 10. Students have knowledge about the strength of a relationship between two variables by using a quantity called the correlation coefficient.
Indicative Contents المحتويات الإرشادية	1) Introduction of Graphical Summaries of Data [1- Relative Frequencies 2- Histogram 3- Ogives 4- The Bar Chart 5- The Pie Chart]. [3 hrs] 2) Measures of Variation [1- The Sample Mean 2- The Sample Median 3- Standard Deviations]. [6 hrs] 3) Exploratory Data Analysis - Coefficient of Variation – Measure of Position – Outliers. [3 hrs] 4) Probability and Counting Rules -Sample Space- Event – Venn Diagram- Two-Dimensional Sample Space – Conditional Sample Space. [3 hrs] 5) Counting Rules for Sample Space. [1- Fundamental Counting rule. 2- Permutation Rule. 3- Combination Rule]. [5 hrs]

	6) The Addition and Multiplication Rules and Conditional Probability. [3 hrs] 7) Discrete Probability Distributions – Permutations and Combinations - Discrete Random Variables. [3 hrs] 8) The Binomial Probability Distributions. [3 hrs] 9) The Poisson Probability Distributions. [3 hrs] 10) Continuous Random Variables. [3 hrs] 11) The Uniform Probability Distribution. [3 hrs] 12) The Exponential Probability Distribution. [3 hrs] 13) Regression. [3hrs] 14) Correlation. [3hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is: 1) To encourage students' participation in solving the statistical problems during the tutorials. 2) Activate the critical thinking skills of the students. 3) Encourage the students to ask questions in the classes. 4) Encourage the students to introduce home works.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6,12	LO # (1-3) and (4-7)
	Assignments	2	10% (10)	6,12	LO #(1-3) and (4-7)

	Lab	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # (5-10)
Summative assessment	Midterm Exam	2 hr	10% (10)	13	LO # 1-8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Statistics - Introduction of Graphical Summaries of Data [1- Relative Frequencies 2- Histogram 3- Ogives 4- The Bar Chart 5- The Pie Chart]
Week 2	Numerical Summaries of Data [Summation notation]- Measures of Variation [1- The Sample Mean 2- The Sample Median 3- Standard Deviations]
Week 3	Exploratory Data Analysis - Coefficient of Variation – Measure of Position - Outliers
Week 4	Probability and Counting Rules -Sample Space- Event – Venn Diagram- Two-Dimensional Sample Space – Conditional Sample Space.
Week 5	Counting Rules for Sample Space. [1- Fundamental Counting rule. 2-Permutation Rule. 3- Combination Rule].
Week 6	The Addition and Multiplication Rules and Conditional Probability
Week 7	Discrete Probability Distributions – Permutations and Combinations - Discrete Random Variables
Week 8	The Binomial Probability Distributions
Week 9	The Poisson Probability Distributions
Week 10	Continuous Probability Distributions – Continuous Random Variables
Week 11	The Uniform Probability Distribution
Week 12	The Exponential Probability Distribution
Week 13	Mid-Term Exam
Week 14	Regression
Week15	Correlation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered (All materials implement by using MATLAB Software program)
Week 1	Graphical Summaries of a given data [1- Relative frequencies 2- Histogram 3- Ogives 4- The bar chart 5- The pie chart]
Week 2	Measures of variation for a given data [1- The sample mean 2- The sample median 3- standard deviations]
Week 3	Estimation a value location in a given data- Drawing a stem-and-leaf diagram
Week 4	Estimation of the median, the lower quartile and the upper quartile in a given data by using quartiles and a cumulative frequency curve or the ogive
Week 5	Sketching the sample space and events for a given data.
Week 6	The addition and multiplication rules and conditional probability
Week 7	Discrete probability distributions [Permutations and Combinations]
Week 8	Estimation of the probability distributions using the discrete random variable
Week 9	Estimation of the probability distributions using the binomial model
Week 10	Estimation of the probability distributions using the Poisson model
Week 11	Estimation of the probability distributions using the continuous random variable
Week 12	Estimation of the probability distributions using the continuous random variable in a constant value over a finite interval (uniform distribution)
Week 13	Estimation of the probability distributions using the exponential function
Week 14	Estimation of a Regression for a given data
Week 15	Estimation of a Correlation for a given data

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ENGINEERING STATISTICS [FIRST YEAR COURSE] DR. SALAH R. AL-ZAIDEE DR. AHMED M. RAOOF University of Baghdad (2018-2019)	No
Websites	https://coeng.uobaghdad.edu.iq/wp-content/uploads/sites/3/2019/09/Engineering-Statistics-by-Dr.-Salah-R.-Al-Zaidee.pdf	

Recommended Texts	Descriptive Statistics [Loughborough University]	No
Websites	https://www.lboro.ac.uk/media/media/schoolanddepartments/mlsc/downloads/HELM%20Workbook%2036%20Descriptive%20Statistics.pdf	
Recommended Texts	Discrete Probability [Loughborough University]	No
Websites	https://www.lboro.ac.uk/media/media/schoolanddepartments/mlsc/downloads/HELM%20Workbook%2037%20Discrete%20Probability%20Distributions.pdf	
Recommended Texts	Continuous Probability [Loughborough University]	No
Websites	https://www.lboro.ac.uk/media/media/schoolanddepartments/mlsc/downloads/HELM%20Workbook%2038%20Continuous%20Probability%20Distributions.pdf	
Recommended Texts	Regression and Correlation [Loughborough University]	No
Websites	https://www.lboro.ac.uk/media/media/schoolanddepartments/mlsc/downloads/HELM%20Workbook%2043%20Regression%20and%20Correlation.pdf	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computer II		Module Delivery	
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB2004			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	UGI	Semester of Delivery		2
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Najlaa Ali Hussein		e-mail	eng.najlaaali.hussein@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD	
Module Tutor	Najlaa Ali Hussein		e-mail	eng.najlaaali.hussein@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	20/10/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Give students an in-depth understanding of network and security information. 2. To introduce a knowledge about the electronic banking services. 3. Give students a knowledge how to identifying and solving common hardware and software problems 4. To introduce a knowledge about AI and its applications.

	5. Give students a knowledge about the role of AI in different aspects of society. 6. Provide “computer skills” curriculum that prepares students for life-long learning of computer concepts and skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) Students will have a knowledge in network and security information. 2) Students will have a knowledge in electronic banking services. 3) Students will have a knowledge in identifying and solving the common problems of Computer Troubleshooting . 4) Students will have a knowledge in AI and its applications. 5) Students will have a knowledge in the impact of AI in different aspects of society. 6) Students will have a knowledge in the ethics, privacy and surveillance of AI and its role in the job marketing. 7) Students will have a knowledge in AI future trends and the recent research and emerging technology.
Indicative Contents المحتويات الإرشادية	1) Network and security information. (1hr) 2) Electronic banking services. (1hr) 3) Identifying and solving the common hardware and software problems. (2hrs) 4) AI and its applications. (2hrs) 5) The impact of AI in different aspects of society. (2hrs) 6) The ethics, privacy and surveillance of AI and its role in the job marketing. (2hrs) 7) AI future trends and the recent research and emerging technology. (2hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students’ participation in programming, while at the same time refining and expanding their critical thinking skills in AI technology. This will be achieved through classes and by computer lab.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	0.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5, 12	LO # 1-3, 4-5
	Assignments	2	5% (10)	5, 12	LO # 1-3, 4-5
	Lab.	1	10% (10)	All	LO # 1-7
	Report	1	10% (10)	14	LO # 1-5
Summative assessment	Midterm Exam	2 hrs	10% (10)	13	LO # 1-5
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Security and Networking: 1) What is a network; 2) Types of networks 3) Basic network components; 4) Network Security Basics; 5) Understanding network threats; 6) Network Troubleshooting.
Week 2	E-Commerce: Concepts of Electronic banking services this include online banking: 1) ATM and debit card services, 2) Phone banking, 3) SMS banking, 4) Electronic alert, 5) Mobile banking.
Week 3	Computer Troubleshooting: 1) Identifying and solving common hardware and software problems that computer users encounter.
Week 4	Computer Troubleshooting: 2) Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 5	Introduction to AI (Artificial Intelligence): 1) Definition of AI; 2) History of AI
Week 6	Introduction to AI: 3) AI Techniques and Applications; 4) Challenges and Ethical Considerations.
Week 7	AI in Our Daily Lives: 1) AI in smartphones
Week 8	AI in Our Daily Lives: 2) virtual assistants like Siri or Google Assistant.
Week 9	Applications of AI: 1) Education
Week 10	Applications of AI: 2) Healthcare 3) Finance.
Week 11	Applications of AI: 4) Transportation, 5) Marketing, 6) Advertising.
Week 12	AI and Society: 1) How AI effects social, 2) AI and international relations, 3) AI and the future of humanity.
Week 13	Mid-Term Exam
Week 14	Ethical Challenges in AI: 1) AI ethics; 2) Privacy and surveillance; 3) The impact of AI on the job market.
Week 15	The Future of AI: 1) Future trends in AI; 2) Recent research and emerging technology.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Security and Networking: 1) What is a network; 2) Types of networks 3) Basic network components; 4) Network Security Basics; 5) Understanding network threats; 6) Network Troubleshooting.
Week 2	E-Commerce: Concepts of Electronic banking services this include online banking: 1) ATM and debit card services, 2) Phone banking, 3) SMS banking, 4) Electronic alert, 5) Mobile banking.
Week 3	Computer Troubleshooting: 1) Identifying and solving common hardware and software problems that computer users encounter.
Week 4	Computer Troubleshooting: 2) Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 5	Introduction to AI: 1) Definition of AI; 2) History of AI
Week 6	Introduction to AI: 3) AI Techniques and Applications; 4) Challenges and Ethical Considerations.
Week 7	AI in Our Daily Lives: 1) AI in smartphones
Week 8	AI in Our Daily Lives: 2) virtual assistants like Siri or Google Assistant.
Week 9	Applications of AI: 1) Education
Week 10	Applications of AI: 2) Healthcare 3) Finance.
Week 11	Applications of AI: 4) Transportation, 5) Marketing, 6) Advertising.
Week 12	AI and Society: 1) How AI effects social, 2) AI and international relations, 3) AI and the future of humanity.
Week 13	Mid-Term Exam
Week 14	Ethical Challenges in AI: 1) AI ethics; 2) Privacy and surveillance; 3) The impact of AI on the job market.
Week 15	The Future of AI: 1) Future trends in AI; 2) Recent research and emerging technology.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1) Graham Brown, Watson David, " Cambridge Information and Communication Technology (IGCSE)", 3 rd Edition (2020)	No
Recommended Texts	2) Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete", 16 th Edition (2020) 3) Ahmed Banafa, " Introduction to Artificial Intelligence (AI), 1 st Edition (2024)	No

	(4) الخضر علي الخضر بحاث "اساسيات الحاسوب" (2016) (5) الدكتور عادل عبد النور "مدخل الى عالم الذكاء الصناعي" (2005)	
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Mechanical Drawing and Assembly with SolidWorks		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	MECH2405			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGII	Semester of Delivery		Four
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Dr. Sahir Almuha		e-mail	eng.sahir.almuhana@uobabylon.edu.iq
Module Leader's ASolid work . Title	lecturer	Module Leader's Qualification	Ph.D	
Module Tutor	N.A.		e-mail	N.A.
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Drawing MECH1104	Semester	UGI: One
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	Studying Mechanical engineering drawing and assemble can help students with the following. 1. Develop skills in interpreting and creating assemble drawing, geometric construction, sketching, isometric, sectional and detailed views. 2. Gain knowledge of material type use. 3. Learn the fundamentals of engineering graphics and design, including computer modeling of geometry. 4. Gain experience in using computer aided design (Solid work) software. 5. Develop skills in communicating through the graphic media of freehand and instrumental drawing and isometric.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Identifying most types of joints. 2- Learning assemblies of mechanical parts. 3- Addressing bolt, nuts, and keys design. 4- Describe methods of gears, springs, and welding symbols drawings. 5- Ability to draw all above parts using Solid work system and regular sheet on drawing board. 6- Ability to draw fast with high accuracy.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Introduction and review [2hrs] 2- Review of SOLID WORK commands. [3hrs] 3- How to draw title and material table[2hrs]. 4- Using tables in SOLID WORK to add details to the SOLID WORK drawing.[3hrs] 5- Types of Joints, Bolts, screws, keys and Knuckles.[3hrs] 6- Design procedure of springs, gears and cams.[3 hrs] 7- Assemble drawing in both sheet board and SOLID WORK console. [3hrs] 8- Using Annotations to link detailed information to the parts drawing. [3hrs] 9- Fittings and tolerances. [3hrs] 10- Examples of Assemble Drawings. [3hrs] 11- Auto Solid work Assemble Drawings. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Our Strategy is to walk the student through mechanical drawing from sketching to the Solid work software accurate drawing. By doing so student will get the benefit of working on SOLID WORK systems. The dual learning techniques will enhance the student learning profile and make students entertained the course.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.133
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5%(10)	3-6	Lo#1-3, 4-5
	Assignments	2	5% (10)	3-6	Lo#1-3, 4-5
	Lab.	1	10% (10)	continuous	1-6
	Report	1	10% (10)	15	LO # 1-6
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Introduction: A quick review to the engineering drawing essential topics, and presenting the syllabus of mechanical drawing.
Week 2	Types of joints in mechanical drawing and assemble: Bolts and Screws
Week 3	Keys, and Knuckles.
Week 4	Springs.
Week 5	Gears.
Week 6	Assemble Drawing.
Week 7	Mid-term test on sheet paper
Week 8	Cams.
Week 9	Welding Symbols.
Week 10	Annotations and Material Tables.
Week 11	Assemble Example
Week 12	Assemble Example
Week 13	Assemble Example
Week 14	Course Review
Week 15	Course Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the Solid work program: Lab 1: Quick Solid work Commands review.
Week 2	Accessing Solid work custom metric sheets.
Week 3	Lab 3: Drawing Bolts and Stud Joints.
Week 4	Lab 4: Drawing Keys and Knuckle joints in Solid work.
Week 5	Lab 5: : Spring Drawing in Solid work program.
Week 6	Lab 6: : Gear Drawing.
Week 7	Lab 7 : : Cam drawing in Solid work.
Week 8	Lab 8: : Assemble Drawing.
Week 9	Lab 9: : Annotations and Material table.

Week 10	Lab 10: : Assemble Drawing Example.
Week 11	Lab 11: : Assemble Drawing Example.
Week 12	Lab 12: : Assemble Drawing Example.
Week 13	Lab 13:Assemble Drawing Example.
Week 14	Course Review
Week 15	Course Review
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Pohit, G. (2004). <i>Machine Drawing with AutoSOLID WORK</i> . Pearson Education India.	No
Recommended Texts	1- Narayana, K. L., Kannaiah, P., & Venkata, K. (2006). Reddy, Machine drawing. <i>New Age International Publishers, New Delhi</i> . 2- عبد الرسول عبد الحسين الخفاف (1986) " الرسم الهندسي " الجامعة التكنولوجية	No Yes
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language II		Module Delivery
Module Type	basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB2302		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineer
Module Leader	Noor Ahmad Hameed	e-mail	Noor.hameed.eng@uobabylon.edu.iq
Module Leader's Acad. Title	Asst.lect	Module Leader's Qualification	Master
Module Tutor	NA	e-mail	NA
Peer Reviewer Name	NA	e-mail	NA
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB1101	Semester	UGI:1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	

أهداف المادة الدراسية	1. To improve English Language skills and understanding the differences between tenses 2. To understand the written text and able to use skimming, scanning skills. 3. To prepare every topic through and get knowledge on way of conducting various tasks. 4. To motivate students by conducting seminars, workshops, events, guest lectures, and competitions on English language frequently. 5. To enable the students comprehend the spoken form of language 6. To develop listening skills. Listening is the basis to learn any language. No one can speak second language without listening.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To know language means to understand and speak the language. 2. Encourages to participate in Role-play which is one of the effective methods for language learning. It develops thinking skills and spontaneity. 3. They can improve their communicative functions or conversational skills like greeting, asking and giving.... Etc. 4. Individualized English language instruction in a small- classroom setting, welcoming, inclusive, and friendly cultural environment. 5. Bringing valuable and diverse international student perspectives to the university. 6. Emphasize and facilitate the growth of critical thinking skills for students 7. Promote the consistent use of English both inside and outside of the classroom. 8. Support the university's various international initiatives with English language training and cultural expertise. 9. Communicate with English speakers, to acquire the linguistic skills necessary for various life situations. 10. Expanding student's vocabulary. Individual words do not constitute vocabulary. Idioms, collocations, and lexical phrases are also included. 11. Try understanding native speakers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Choosing the right verb and forming the present participle, past continuous, Opposite adjective, Making positive and negative sentences, Joining sentences, choosing the correct conjunction. Writing composition (2hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, considering type of simple experiments involving some sampling activities that are interesting to the students. Also, the other strategy is to make mistakes and try

	new things out, mistakes are an essential part of learning a language. To become a better speaker, you have to speak, even if you make lots of mistakes. And finally, focusing on listening. Listening turns out to be a really effective way to learn a language.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	2	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	0.1333
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5, 9	LO #1, 2, 10 and 11
	Assignments	2	5% (10)	3, 11	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	14	LO # 1-11
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hrs	10% (10)	7	LO # 1-7
	Final Exam	2hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Tenses. Question form. Vocabulary. Writing
Week 2	Present simple, continuous (have, have got) vocabulary
Week 3	Past simple
Week 4	Count and un count nouns. Expressions of quantity. Articles.
Week 5	Verb patterns
Week 6	Comparative and superlatives

Week 7	Mid-term Exam
Week 8	Present perfect. Tense revision
Week 9	Modals (should, must)
Week 10	Conditional clauses. Time clauses.
Week 11	Verb patterns (used to) infinitives.
Week 12	The passive
Week 13	Second conditional (might)
Week 14	Present perfect simple
Week 15	Reported statements
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of English language teaching. New Head way Plus. John and Liz Soars. Pre-intermediate student's Book	yes
Recommended Texts	Translation	No
Websites	https://www.hiapkdownload.com/new-headway-pre-intermediate-student-book/com.newheaway231564/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Strength of Materials II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2404		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering College
Module Leader	Mohammed Jawad Aubad	e-mail	eng.mohammed.j.tarfa@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Mohammed Jawad Aubad	e-mail	eng.mohammed.j.tarfa@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Strength of Materials I MECH2305	Semester	UGII: Three
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To learn transforming the stress components acting on an element at a point into components acting on a corresponding element having a different

	orientation. - To learn finding the maximum normal and maximum shear stress at the point, and find the orientation of the elements upon which they act. - To learn the theories used to predict the failure of a material. - To learn designing of shafts based on their resistance to both internal bending and torsion. - To learn driving the elastic curve deflection and slope of beams and shafts using integration method and discontinuity functions. - To learn solving for the support reactions on a beam or shaft that is statically indeterminate. - To learn analyzing and solving for buckling behavior of a column subjected to axial and eccentric loads.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Students would have the ability to determine the stress at any element within the structure in different orientations. - Students would have the ability to determine the principal and maximum shear stresses in an element within the structure. - Students intended to have the ability of predicting the failure of the structure. - Understanding how shafts are designed. - Learning estimation of elastic beam deflection and finding the reactions of statically indeterminate beams. - Analyzing columns buckling.
Indicative Contents المحتويات الإرشادية	- Stress transformation [18 hrs] - Theories of failure [10 hrs] - Design of shafts [10 hrs] - Deflection of Beams and Shafts [14 hrs] - Buckling of columns [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by strength of materials lab.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	8	LO # 1, 2, 3, 4 and 5
	Assignments	1	10% (10)	14	LO # 6
	Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	15	LO # 1-6
Summative assessment	Midterm Exam	2 hrs	10% (10)	7	LO # 1-4
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Plane-Stress Transformation
Week 2	General Equations of Plane-Stress Transformation
Week 3	Principal Stresses and Maximum In-Plane Shear Stress
Week 4	Mohr's Circle - Plane Stress
Week 5	Theories of Failure
Week 6	Shaft Design
Week 7	Midterm exam
Week 8	Deflection of Beams and Shafts
Week 9	The Elastic Curve Equation
Week 10	Slope and Displacement by Integration
Week 11	Discontinuity Functions
Week 12	Statically Indeterminate Beams and Shafts—Method of Integration
Week 13	Critical Buckling Load of Columns
Week 14	Ideal Column with Pin Supports
Week 15	Columns Having Various Types of Supports

Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Conducting tensile test
Week 2	Lab 2: Conducting compressive test
Week 3	Lab 3: Conducting Rockwell hardness test
Week 4	Lab 4: Conducting Brinell hardness test
Week 5	Lab 5: Conducting Vickers hardness test
Week 6	Lab 6: Conducting Izod impact test
Week 7	Lab 7: Conducting Charpy impact test
Week 8	Lab 8: Conducting bending test
Week 9	Lab 9: Conducting torsion test
Week 10	Lab 10: Conducting direct shear test
Week 11	Lab 11: Conducting creep test
Week 12	Lab 12: Conducting deflection test on cantilever beam
Week 13	Lab 13: Conducting deflection test on simply supported beam
Week 14	Lab 14: Conducting buckling test
Week 15	Lab 15: Use of electrical resistance strain gauge

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mechanics of Materials Tenth Edition, 2018 R. C. HIBBELER	No
Recommended Texts	Mechanics of Materials First edition, 2007 Ansel C. Ugural	No
Websites	https://sm-nitk.vlabs.ac.in/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Theory of Machines		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MECH2403		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering College
Module Leader	Mohammed Ali Saihood	e-mail	eng.msaihood@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Mohammed Ali Saihood	e-mail	eng.msaihood@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics: dynamics MECH2303	Semester	UGII: Three
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	1- Students shall gain knowledge about the velocity and acceleration of mechanism and may solve related problems. 2- To gain knowledge about equilibrium of Rotating and Reciprocation Masses. 3- Students will learn the basic principles of friction especially screw jack. 4- Gaining information about design, production and application of belt drive. 5- the student will study the Universal or Hook's Joint and its application. 6- Enable the student to understand the function of a governor and type of governor. 7- Students shall gain knowledge about classification of followers., classification of Cams and motion of the follower. 8- Students shall gain specific information about friction clutches and cone clutch. 9- Students will gain the fundamental knowledge for Flywheel and how can determine of maximum fluctuation of energy for a multicylinder engine. 10- Students shall gain specific information about type of gears, gear trains and epicyclic gear train. 11- To study about gyroscope and its effects during precession motion of moving vehicles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students would have up to date information, software, theoretical and practical knowledge on velocity and acceleration of slider-crank mechanisms. 2. Students would acquire theoretical knowledge about Governor types. 3. Students will have the ability to determine the loads and calculate the unbalanced torques of the rotary and reciprocating masses. 4. Students will be able to determine the loads, torques and calculate the efficiency of jack screw. 5. Students would have up to date information, software, theoretical and practical knowledge on gear types, gear train and epicyclic gear train. 6. Students will be able to apply their knowledge of theory of machine to solve the problems with flywheel, belts and friction crutches. 7. Students will be able to design Cams and motion of the follower.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Velocity and acceleration in Mechanisms</u> Relative velocity and acceleration of Two bodies moving in straight lines. Velocity and acceleration of a point on a link by relative velocity and acceleration method. Velocity and acceleration in the slider crank mechanism. Coriolis component of acceleration. [10 hrs] <u>belt</u> Types of belt drives. Velocity ratio of belt drive. Length of an open and cross belt drive. Power transmitted by a belt. Ratio of driving tensions for flat belt drive. Determination of angle of contact. Centrifugal tension. [5 hrs] <u>Toothed Gearing</u>

	Standard properties of gear system. Length of path of contact. Length of arc of contact. Contact ratio. Interference in involute gears. Minimum number of teeth on the pinion in order to avoid interference. [5 hrs] <u>Gear Trains</u> Types of gear trains. Simple gear train. Compound gear train. Design of spur gear. Epicyclic gear train. Velocity ratio of epicyclic gear train. Compound epicyclic gear trains (Sun and Planet wheel). Torques in epicyclic gear trains. [10 hrs] <u>Turning Moment Diagrams and Flywheel</u> Turning moment diagrams for a four-stroke cycle internal combustion engine. Turning moment diagrams for a multicylinder engine. Fluctuation of energy. Determination of maximum fluctuation of energy. Coefficient of fluctuation of energy. Coefficient of fluctuation of speed. [5 hrs] <u>Universal or Hook's Joint</u> Ratio of the shaft's velocities. Maximum and minimum speeds of the driven shafts. Condition for equal speeds of the driven and driving shafts. Angular acceleration of the driven shaft. Maximum fluctuation of speed. Double Hook's joint. [4 hrs] <u>Friction Clutches</u> Single disc or plate clutch. Multiple disc clutch. Cone clutch. Centrifugal clutches. [5 hrs] <u>Governors</u> Types of governors. Centrifugal governors. Terms used in governors. Watt governor. Porter governor. Proell governor. [5 hrs] <u>Cams</u> Classification of followers. Classification of Cams. Motion of the follower. Displacement, velocity and acceleration diagrams when the follower moves with uniform velocity. Displacement, velocity and acceleration diagrams when the follower moves with simple harmonic motion. Displacement, velocity and acceleration diagrams when the follower moves with uniform acceleration and retardation. [5 hrs] <u>Balancing of Rotating and Reciprocation Masses</u> Balancing of a single rotating mass by a single mass rotating in the same plane. Balancing of a single rotating mass by two masses rotating in different planes. Balancing of a several masses rotating in the same plane. Primary and secondary unbalanced forces of reciprocating masses. Partial balancing of unbalanced primary force in a reciprocating engine. [8 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time

	refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 14	LO # 1- 4, and 5-7
	Assignments	2	10% (10)	6, 14	LO # 1- 4, and 5-7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	15	LO # 1-7
Summative assessment	Midterm Exam	2 hrs	10% (10)	7	LO # 1-4
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Velocity in mechanism
Week 3	Acceleration in mechanism
Week 4	Cams
Week 5	Friction clutches
Week 6	Power screw

Week 7	Mid-term Exam
Week 8	Turning moment diagrams and flywheel
Week 9	Belt drives
Week 10	Hook's joint
Week 11	Toothed gearing
Week 12	Gear trains
Week 13	Governors
Week 14	Balancing of rotating masses
Week 15	Balancing of reciprocating masses
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Determination of velocity of slider crank mechanism.
Week 2	Lab 2: Determination of acceleration of slider crank mechanism.
Week 3	Lab 3: Perform balancing of rotating unbalanced system.
Week 4	Lab 4: Perform balancing of reciprocating unbalanced system.
Week 5	Lab 5: Determination of parameters of belts drive.
Week 6	Lab 6: Assembly and disassembly of clutches part I
Week 7	Lab 7: Assembly and disassembly of clutches part II
Week 8	Lab 8: Measurement of Parameters of flywheel
Week 9	Lab 9: Determination torque in screw jack.
Week 10	Lab 10: Draw profile of a radial cam for given follower type. Part I
Week 11	Lab 11: Draw profile of a radial cam for given follower type. Part II
Week 12	Lab 12: Governor's characteristics.
Week 13	Lab 13: Compound gear train
Week 14	Lab 14: Epicyclic gear train
Week 15	Lab 15: Exploring the Precession and Nutation of a Gyroscope.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Theory of Machine; 14th ed Khurmi, R. et al 2005	Yes
Recommended Texts	Mechanics of Machine: elementary theory and example JOHN HANNAH 1972.	No
Websites	https://books.google.iq/books/about/Theory_of_Machines.html?id=1WDgwAEACAAJ&redir_esc=y	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	UOBAB0102013		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGI	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering College
Module Leader	Lekaa hameed	e-mail	eng.liqaa.hameed@uobabylon.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	N.A	e-mail	N.A
Peer Reviewer Name	N.A	e-mail	N.A
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- To familiarize the student with the importance of engineering drawing. 2- The student learns how to imagine geometric shapes. 3- To distinguish the mechanical components and parts and the principle of their work. 4- To develop the student's mental and motor ability in drawing simple and complex shapes. 5- The student learns how to develop a strategy and sequence for drawing, assembling and disassembling geometric shapes, drawing projections, and setting dimensions. 6- Understanding all the engineering properties of any mechanical part or product clearly and communicating the basic information that enables the factory to produce this mechanical part .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Increasing the student's ability to imagine engineering objects and methods of drawing them. 2- Distinguish between manual drawing and computer drawing and the ability to deal with it. 3- Acquisition of speed and great ability in drawing various engineering parts. 4- Dealing with drawing using the AutoCAD program.
Indicative Contents المحتويات الإرشادية	7- Indicative content includes the following. 8- 9- Introduction [1hr] 10- Graphic instruments and their use.[1hr] 11- Lettering Graphic Geometry.[4hr] 12- Multi view orthogonal graphic projection In, first- and third- Angle projection 13- Dimension.[7hr] 14- Third view.[5hr] 15- Isometric drawing and sketching, Oblique drawing, Section of Isometric drawing, Sectional view .[6hr] 16- Auto Cad.[8]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	17- A full explanation of the subject of manual engineering drawing and drawing using the computer in the AutoCAD program and the practical application of that. Developing the student's skills through scientific and systematic thinking and the ability to draw engineering. Enhancing the student's skill in facing some problems related to drawing engineering drawings and developing responsibility while drawing engineering drawings.
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Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 10,14	LO #1, 2 to 13
	Assignments	10	10% (10)	2,3,4,5,6,7,9, 10,11,12	LO # 2 to 11
	Projects / Lab.	3	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	LO # 11
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introducing: Introducing the student to a subject about the importance of engineering drawing and identifying engineering tools and how to use them. Types of pens used, board layout, address field preparation, how to deal with the engineering board, and how to install the engineering sheet.
Week 2	types of lines in engineering drawing: Visible and continuous lines, hidden lines, center lines, dimension lines, cutting lines, and drawing an application board that includes this topic.
Week 3	Explain and illustrate how to put dimensions on any drawn geometric object.
Week 4	engineering operations: Teach the student how to apply and draw engineering operations Part 1 :Drawing parallel and intersecting lines, bisections of angles, and hexagons and pentagons,.....etc. and drawing applied exercises on this subject.

Week 5	engineering operations: part 2 :Drawing tangential arcs and how to draw the ellipse Drawing applied exercises on this subject.
Week 6	The vertical projection theory of objects: Part 1 : How to deduce the three projections in the first even angle,(front view, side view, and top view)
Week 7	The vertical projection theory of objects: Part 2 : How to arrange and draw the projections required for any object on the drawing sheet.
Week 8	The vertical projection theory of objects: Part 3 : Drawing applied exercises on the vertical projection theory of objects.
Week 9	The theory of cuts and sections in engineering drawing: Part 1 : full section (S.F.V, S.S.V, S.T.V)
Week 10	The theory of cuts and sections in engineering drawing: Part 2 : half - section (H.S.F.V, H.S.S.V, H.S.T.V)
Week 11	Midterm Exam + The theory of cuts and sections in engineering drawing: Part 3 : Drawing applied exercises on this subject .
Week 12	The missing view : Part 1: explained how find the missing view
Week 13	The missing view : Part 2: Drawing applied exercises on this subject .
Week 14	Explanation of the subject of three-dimensional drawing Part 1: (Isometric drawing)
Week 15	Part 2: (Isometric drawing): Linking the given projections with the process of imagining and drawing the isometric body, and drawing applied exercises on this subject .
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to the AutoCAD program: Lab 1: Learn about the program and how to use it with engineering drawing material, Commands, screen and menus.
Week 2	Lab 2: Drawing exercise about types of lines in engineering drawing using the AutoCAD program.
Week 3	Lab 3: Drawing exercise about put the dimension using the AutoCAD program.
Week 4	Lab 4: part 1: Drawing exercise about engineering operations using the AutoCAD program.
Week 5	Lab 5: : part 2: Drawing exercise about engineering operations using the AutoCAD program.
Week 6	Lab 6: : part 1: Drawing exercise about the vertical projection theory of objects using the AutoCAD program. (Front view)
Week 7	Lab 7: part 2: Drawing exercise about the vertical projection theory of objects using the AutoCAD program. (Side view)
Week 8	Lab 8: part 3: Drawing exercise about the vertical projection theory of objects using the AutoCAD program. (Top view)
Week 9	Lab 9: part 1: Drawing exercise about the theory of cuts and sections in engineering drawing

	of objects using the AutoCAD program. (S.F.V) and (H.S.F.V)
Week 10	Lab 10: part 2: Drawing exercise about the theory of cuts and sections in engineering drawing of objects using the AutoCAD program.(S.S.V) and (H.S.S.V)
Week 11	Lab 11: part 3: Drawing exercise about the theory of cuts and sections in engineering drawing of objects using the AutoCAD program. (S.T.V) and (H.S.T.V)
Week 12	Lab 12: part 1: Drawing exercise about missing view theory of objects using the AutoCAD program.
Week 13	Lab 13: part 2: Drawing exercise about the missing view theory of objects using the AutoCAD program.
Week 14	Lab 14: part 1: Drawing exercise about (Isometric drawing)of objects using the AutoCAD program.
Week 15	Lab 15: part 2: Drawing exercise (Isometric drawing)of objects using the AutoCAD program.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- عبد الرسول عبد الحسين الخفاف (1986) " الرسم الهندسي " الجامعة التكنولوجية	Yes
Recommended Texts	1- فتحي الشريف (1978) " الرسم الهندسي " جامعة حلب 2- المرجع في الرسم الهندسي د. محمود صالح 3- Manual of engineering drawing – Simmons C.H. , Maguire D.E 4- The fundamentals of engineering drawing / Thomas E.F.& Charles J.	No
Websites	http://noor-book.com/x0patg http://noor-book.com/7fybwm http://noor-book.com/i4bgxl	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Organic Chemistry		Module Delivery	
Module Type	Basic		☒ Theory Lecture ☒ Lab ☒ Tutorial Practical ☒ Seminar	
Module Code	ENV112			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Basrah Engineering Technical College	
Module Leader	Alya A. Mohammed		e-mail	alayaalrefee@stu.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	AhlamSalihDakhil		e-mail	ahlamzozo207@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	20/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of studying organic chemistry: 1- The student is introduced to organic materials, types of chemical bonds, and orbitals. 2- Identify the active groups present in each type of organic compound. 3- Identifying the physical and chemical properties of organic compounds. 4- Know the methods of analysis of organic materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Know the types of chemical bonds that bind organic compounds and the types of orbitals. 2- Knowing the types of organic compounds and distinguishing between them through knowing the active groups in each type. 3- Knowledge of the physical and chemical properties of organic compounds. 4- Detection of organic functional groups using IR and UV. 5- Being able to measure the melting point and boiling point laboratory. 6- Learn the technique of purifying an organic substance and separating a mixture of several chemicals.
Indicative Contents المحتويات الإرشادية	Organic chemistry, bonds, dipolar couple type of hybridization, orbitals. Hydrocarbon: alkanes, formulation-Hydrocarbons-saturated.Alkene.Acetylene. Aromatic hydrocarbon. Halogen compounds.Ethers. Alcohols. Phenols. Amines, derivatives of amine, diazoniemsats. Aldehydes and ketones. Carboxylic acids .Esters. Amide. Cyclic compounds, Detection of organic functional groups using IR and UV. Practical organic chemistry physical properties of liquid and solid organic compounds, normal distillation and partial distillation. Preparatory week before the final Exam

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the practical experiments that engaged with chemical material while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive in laboratory and by considering types of simple experiments .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2, 4, 6, 8	LO #3, #4 and #6, #7
	Projects / Lab.	10	10% (10)	Continuous	All
	Report	5	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1.5hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Organic chemistry, bonds, dipolar couple type of hybridization, orbitals.
Week 2	Hydrocarbon: alkanes, formulation-Hydrocarbons-saturated.
Week 3	Alkene.
Week 4	Acetylene.
Week 5	Aromatic hydrocarbon.
Week 6	Aromatic hydrocarbon. Midterm Exam + Halogen compounds
Week 7	
Week 8	Ethers. Alcohols. Phenols. Amines, derivatives of amine, diazonium salts.
Week 9	
Week 10	Aldehydes and ketones.
Week 11	Carboxylic acids
Week 12	Carboxylic acids

Week 13	Amide.
Week 14	Cyclic compounds, Detection of organic functional groups using IR and UV. Practical organic chemistry physical properties of liquid and solid organic compounds, normal distillation and partial distillation.
Week 15	
Week 16	Preparation for Final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction of glasses and devices and material in lap
Week 2	Melting point
Week 3	Boiling point
Week 4	Extraction
Week 5	Crystallization
Week 6	Filtration
Week 7	Distillation simple
Week 8	Midterm exam
Week 9	Distillation fraction
Week 10	Preparation of Methane
Week 11	Preparation of Ethylene
Week 12	Preparation of Acetylene
Week 13	Preparation for final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Morrison & Boyd, Organic Chemistry, Prentice Hall	yes
Recommended Texts	1-Bahl & Bahl, Advanced Organic Chemistry	yes
Websites		

Grading Scheme

مخطط الدرجات

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

Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	CAD-CAM		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102054			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		five
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Abdul Kareem Jaleel I Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Module Leader's Acad. Title	Assist.Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Abdul Kareem Jaleel Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB0102025	Semester	UGI, 2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- to understand the role of computers in design and manufacturing 2- To provide an in-depth understanding of manufacturing and database systems 3- To provide an understanding of needs of the market and design the product 4- To design and develop material handling, storage and retrieval systems for specific cases of manufacturing 5- To develop CIM systems for current manufacturing scenario by using computer and networking tools.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this course the student is expected to : 1. Understand the basic fundamentals of computer aided designing and the fundamental of CAD Graphic standards and their modes 2. Student will be able to understand the concept of geometric modeling 3. Learn development of curves, surfaces, solid models for mechanical designs and FEA. 4. Student will be able to solve the surface modeling and their engineering application 5. Students will be able to analysis of solid models of engineering applications 6. Students will be get idea of strategic plan for CAD system Design & development 7. Understand basics of NC, CNC, DNC and robotics 8. Acquire knowledge about advanced manufacturing systems like FMS, CIM, CAPP etc.
Indicative Contents المحتويات الإرشادية	- Fundamentals of CAD: Introduction, Geometric modeling technique. [10 hrs] - Mechanical tolerancing, Mass property calculations: Geometrical property formulation - Curve length, Cross-sectional area, Surface area, [8 hrs] - Chemical ,physical ,electrical properties [8 hrs] - Introduction: NC, DNC, CNC, Programmed Automations, Machine control unit, Part program, NC tooling [8 hrs] - Computer aided part programming, NC languages NC machine tools: Nomenclature of NC machine axes, Types of NC machine tools . [8 hrs] - Machine control unit & tooling: Functions of MCU, Manual part programming: Part program instruction formats, [10 hrs] - Tool path generation CAD/CAM NC Programming [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by computer aided design and manufacturing tutorial.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3, 5, 7, 11	LO # 1, 2, 3, 4 + 5
	Assignments	1	10% (10)	14	LO # 5
	Lab.	-	-	-	
	Report	1	10% (10)	12	LO # 1-5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-3
	Final Exam	2hr	60 % (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamentals of CAD: Introduction, Design process, Application of computer for design, Creating the manufacturing database, Benefits of CAD.
Week 2	Geometric modeling: Geometric modeling techniques - Multiple view 2D input, Wire frame geometry, Surface models, Geometric entities
Week 3	Curves and Surfaces, Solid modelers, Feature recognition.

Week 4	Design work station, CAD hardware - Computer aided drafting: AutoCAD tools, 3D model building using solid primitives and boolean operations, 3D model building using extrusion, Editing tools, Multiple views: Orthogonal, Isometric.
Week 5	Mechanical tolerancing: Tolerance concepts, Geometric tolerancing, Types of geometric tolerances, Location tolerances, Drafting practices in dimensioning and tolerancing, Tolerance analysis.
Week 6	Mass property calculations: Geometrical property formulation - Curve length, Cross-sectional area, Surface area, Mass property formulation - Mass, Centroid, Moments of inertia, Property mapping. Properties of composite objects
Week 7	Introduction: NC, DNC, CNC, Programmed Automations, Machine control unit, Part program, NC tooling. Computer aided part programming: NC languages: APT, NELAPT, EXAPT, GNC, VNC, Preprocessor, Post processor. APT programming: APT language structure, APT geometry: Definition of point, time, vector, circle, plane, patterns and matrices. APT motion commands: setup commands, point-to-point motion commands, continuous path motion commands. Part programming preparation for typical examples.
Week 8	NC machine tools: Nomenclature of NC machine axes, Types of NC machine tools, Machining centers, Automatic tool changes (ATC), Turning centers.
Week 9	Midterm exam
Week 10	Machine control unit & tooling: Functions of MCU, NC actuation systems, Part program to command signal, MCU organization, Computerized numerical control, Transducers for NC machine tools, Tooling for NC machining centers and NC turning machines, Tool presetting.
Week 11	Manual part programming: Part program instruction formats, Information codes: Preparatory function, Miscellaneous functions, Tool code and tool length offset, Interpolations, Canned cycles. Manual part programming for milling operations, Turning operations, Parametric subroutines.
Week 12	Tool path generation
Week 13	Tool path verification
Week 14	CAD/CAM NC Programming
Week 15	Cellular Manufacturing
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	CAD/CAM: computer-aided design and manufacturing Zimmers, Emory W.; Groover, Mikell P 1984	No
Recommended Texts	CAD/CAM Theory and Practice Ibrahim Zeid and R. Sivasubramanian 2009	No
Websites	https://libgen.rs/book/index.php?md5=357763261443A30C75D2BAB6511ADE98	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Analysis		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102051		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq rehabnoormoh.alkaby@montana.edu rehabnoor@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics III UOBAB0102031	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- Providing a comprehensive illustration of advanced engineering mathematics to improve students' skills in solving practical problems that deal with mechanical engineering fields, such as mechanical vibrations, fluid flow, and heat transfer problems. 2- Giving a background for periodic functions and infinite series to present the fundamental of a Fourier transform analysis and Fourier integrals and then diving deep into their applications for solving boundary value problems and eigenvalue-eigenfunction problems. 3- Explaining the concept of Laplace transformation and its properties and applications for solving linear ordinary differential equations and related initial value problems. 4- Demonstrating the partial differential equations and the most important kinds of them in physics and engineering, which include the wave equation, the heat equation, and the Laplace equation. In addition, explaining the separation of variables method to solve those kinds of equations in one and multi-dimension and under steady or unsteady state conditions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Students are prepared to solve any task relating to the areas listed above. 2- Students have a good foundation in engineering mathematics that will help them in their future studies or careers. 3- Students are capable to interpret the mathematical results from a physical or an engineering view to see what it means in practice and its implications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Periodic function and infinite series [4 hrs]. - Fourier series [8 hrs]. - Half range expansions [8 hrs]. - Complex form of Fourier series [8 hrs]. - Fourier Integral [8 hrs]. - Laplace transform method [7 hrs]. - Unit step function [4 hrs]. - Convolution theorem [5 hrs]. - Laplace transformation of periodic function [8 hrs]. - Basic introduction to partial differential equations, involving wave equation, heat equation, and Laplace equation [2 hrs]. - Separation of variables method to solve one and multi-dimensional initial and value problems in Cartesian and polar coordinates [10 hrs].

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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	To provide the best foundation for demonstrating lessons, explicit instruction is used by explaining materials step by step with making sure to focus on any new vocabulary and concepts. Moreover, giving several examples starting from the easiest to the hardest ones with making a connection between math and life during the class to allow students to follow some patterns in solving problems and answering questions.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, and 10	1 and 3
	Assignments	4	10% (10)	3, 6, 9, and 12	1 and 3
	Projects / Lab.	-	10% (10)	Continuous	
	Report	1	10% (10)	12	
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	1 and 3
	Final Exam	3 hrs	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to trigonometric and periodic functions
Week 2	Basic concept of Fourier analysis
Week 3	Half range sine and cosine expansions
Week 4	Complex form of Fourier transform
Week 5	Fourier integral
Week 6	General form of Laplace transform
Week 7	Linearity and first shifting theorem (s-shifting)
Week 8	Transforms of derivatives and integrals
Week 9	Unit step function and second shifting theorem (t-shifting)
Week 10	Convolution theorem and Laplace transform of periodic functions
Week 11	Midterm Exam / Basic concept of partial differential equations (wave, heat, and Laplace equations)
Week 12	Solution by separating variables
Week 13	Modeling steady state one and two-dimensional problems in Cartesian coordinates
Week 14	Modeling unsteady state one and two-dimensional problems in Cartesian coordinates
Week 15	Modeling systems in polar coordinates
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Kreyszig, E., H. Kreyszig, and E.J. Norminton, <i>Advanced engineering mathematics</i> . 10 th ed. ed. 2011, Hoboken, New Jersey: Wiley.	No
Recommended Texts	- Gustafson, Wilcox, C. H., & Wilcox, C. H. (Calvin H. (1998). <i>Analytical and computational methods of advanced engineering mathematics</i> (1st ed. 1998.). Springer Science. https://doi.org/10.1007/978-1-4612-0633-0. - Potter. (2019). <i>Engineering Analysis</i> (1st ed. 2019.). Springer International Publishing. https://doi.org/10.1007/978-3-319-91683-5.	No
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering materials		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102054			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	UGIII	Semester of Delivery		5
Administering Department	Mechanical Engineering	College	College of Engineering	
Module Leader	Abdul Kareem Jaleel I Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Module Leader's Acad. Title	Assist.Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Abdul Kareem Jaleel Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	31/05/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Manufacturing Engineering UOBAB0102025		Semester	2
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Engineering Material course will provide student fundamental of the Structure – Properties – Design – Performance of all types of materials (ceramics, metals and their alloys, polymers and composites). The course aim to: 1. Understand the concepts of atomic bonding, crystal structures, imperfections, diffusion, mechanical properties, electron energy, and dislocations as related to processing and performance of engineering materials. 2. Understand the relationship between structure-processing-properties for selection of existing materials and development of new materials in the design of parts, structures, and devices. 3. Understand the microstructure characteristics, electronic properties, materials formation, and manipulation of microstructure for application in engineering design and materials processing. 4. Understand the relations between the composition, temperature and phase fractions applied to equilibrium phase diagrams for given material systems. 5. Apply numerical solutions with clear insight into the basis for the selected solution for properties and characteristics of the given material using materials property data.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will recognize how the internal structure of a material (both at the micro and macro levels) controls the mechanical properties. 2. Students will be able to explain how dislocation motion is responsible for permanent deformation in metals and how the ability to undergo slip influences the mechanical properties of the material. 3. Students will realize their ability to control the mechanical properties of materials through a variety of processes and the implications on materials selection and design. 4. Student will gain a basic knowledge of metals, polymers, and ceramics, along with some aspects of nano -materials. 5. Student will learn the fundamental properties of materials, along with the fundamental aspects of phase diagrams and the concepts of degradation and failure.
Indicative Contents المحتويات الإرشادية	- Introduction ,structure of metal ,mechanical properties [8 hrs] - Phase diagram ,various types of steel [10 hrs] - Chemical ,physical ,electrical properties [8 hrs] - Polymer, plastic ,ceramic [10 hrs] - Copper, aluminum [10 hrs] - Material selection [6 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by engineering material lab.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3, 5, 7, 11	LO # 1, 2, 3, 4 + 5
	Assignments	1	10% (10)	14	LO # 5
	Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	12	LO # 1-5
Summative assessment	Midterm Exam	2 hrs	10% (10)	9	LO # 1-3
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعية النظرية

	Material Covered
Week 1	Introduction , The structure of crystalline solids.
Week 2	Mechanical properties of metals(Tensile, Fatigue).

Week 3	Mechanical Properties of metals(Creep, Impact, Hardness)
Week 4	Deformation and Strengthening Mechanisms
Week 5	Phase diagrams.
Week 6	Chemical Properties, Physical properties, Corrosion and Cathodic Protection
Week 7	Carbon Steel, Low alloy Steel, Heat Resistant Steel, Tools and High Speed Steel
Week 8	Polymer and its structure
Week 9	Midterm exam
Week 10	Ceramic crystal structure
Week 11	Thermal and Insulating Materials
Week 12	Copper and Its Alloys
Week 13	Aluminum Alloys
Week 14	Material selection and application
Week 15	Introduction to nano-material
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Conducting tensile test
Week 2	lab 2: study crystal lattice with help of models
Week 3	lab 3: Quantitative and qualitative analysis of microstructure using optical microscopy and scanning electron microscopy
Week 4	Lab 4: study cooling curve of a binary alloy
Week 5	Lab5: Determination of the elastic modulus and ultimate strength of a given fiber strand.
Week 6	Lab 6: Study the effect of grain size on hardness of the given metallic specimens
Week 7	Lab 7: To determine fiber and void fraction of a glass fiber reinforced composite specimen
Week 8	Lab 8: To investigate creep of a given wire at room temperature.
Week 9	Lab 9 : To determine the mechanical properties of aluminum and copper
Week 10	Lab 10: To study the mechanism of chemical corrosion and its protection
Week 11	Lab 11: To study heat treatment process on steel specimen
Week 12	Lab 12: Detection of flaws using ultrasonic flaw detector (UFD).
Week 13	Lab 13: non-destructive testing experiment
Week 14	Lab 14: study the properties of various types of ceramic
Week 15	Lab 15: study the thermo setting of plastic

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	MATERIAL SCIENCE S.L. KAKANI 2006	No
Recommended Texts	ENGINEERING MATERIAL II(An Introduction to Microstructures, Processing and Design) Michael F. Ashby 1998	No
Websites	https://libgen.rs/book/index.php?md5=A488A7F71B5D17CA8B6BB87280873AF4	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Finite Element		Module Delivery
Module Type	Elective		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102087		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level		Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq rehabnoormoh.alkaby@montana.edu rehabnoor@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq
Peer Reviewer Name	NA	e-mail	NA
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB0102061	Semester	UGIII,6
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- Explaining the concepts behind formulation techniques in the finite element method (FEM) and providing a basic understanding of the significance of this method in the simulation of various mechanical engineering problems. 2- Demonstrating the numerical procedures for the discontinuous finite element formulation, the integral formulation, the time integration, the shape functions, and the element formulation. 3- Discussing a finite element method to solve element-by-element in detail through simple, elementary, and illustrative examples. 4- Explaining and discussing the 1-D, 2-D, and 3-D numerical integration and domain and elemental calculations, followed by a detailed description of the various types of boundaries of homogeneous and nonhomogeneous structures. 5- Covering the application of the finite element method to solve different problems dealing with thermal and fluid sciences.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Students have learned the basic principles of finite element analysis procedure. 2- Students have learned the theory and characteristics of finite elements that represent engineering structures. 3- Students are prepared to apply finite element solutions to structural, thermal, and dynamic problems. 4- Students' knowledge and skills are developed to effectively use a finite element method for future research in different fields like computational fluid dynamics and heat transfer.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Discontinuous finite element formulation [2 hrs]. - Integral formulation and time integration [5 hrs]. - Solution procedures using discontinuous finite element [10 hrs]. - Shape functions and elemental calculations / 1-d shape functions [10 hrs]. - 2-D shape functions / triangular and quadrilateral elements [10 hrs]. - 1-D, 2-D, and 3-D numerical integration [10 hrs]. - Domain and boundary calculations [5 hrs]. - Applications in thermal science and fluid mechanics [10 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	To provide the best foundation for demonstrating lessons, explicit instruction is used by explaining materials step by step with making sure to focus on any new vocabulary and concepts. Moreover, giving several examples starting from the easiest to the hardest ones with making a connection between math and life during the class to allow students to follow some patterns in solving problems and answering questions.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, and 10	1, and 2
	Assignments	6	10% (10)	3,4, 7, 10, 12, and 14	1, 2, and 3
	Projects / Lab.	-	10% (10)	Continuous	
	Report	1	10% (10)	14	
Summative assessment	Midterm Exam	2 hrs	10% (10)	9	1, 2, and 3
	Final Exam	3 hrs	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the Finite Element Method and Discontinuous Finite Element Formulation
Week 2	Cross-Element Continuity with Numerical Boundary Fluxes for Discontinuity
Week 3	Discontinuous Finite Element Formulation / Integral Formulation / Time Integration
Week 4	Solution Procedures Using Finite Element
Week 5	Shape Functions and Elemental Calculations / 1-D Shape Functions
Week 6	2-D Shape Functions / Triangular Elements
Week 7	2-D Shape Functions / Quadrilateral Elements
Week 8	Background about a Higher Order Shape Functions
Week 9	Midterm Exam
Week 10	Introduction to a Numerical Integration / 1-D Numerical Integration
Week 11	2-D and 3-D Numerical Integration
Week 12	Elemental Calculations / Domain Calculations
Week 13	Boundary Calculations for Homogeneous and Nonhomogeneous Structures
Week 14	Applications in Thermal Science and applied structure
Week 15	Applications in fluid dynamics
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Zohdi. (2015). <i>A Finite Element Primer for Beginners the Basics</i> (1st ed. 2015.). Springer International Publishing. https://doi.org/10.1007/978-3-319-09036-8 .	No
Recommended Texts	- Lyu. (2022). <i>Finite Element Method</i> . Springer Nature Singapore Pte Ltd. - Raju. (2022). <i>The Discontinuous Galerkin Finite Element Method</i> . National Aeronautics and Space Administration, Langley Research Center.	No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Internal Combustion Engine		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102055		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of engineering
Module Leader	Samer M. Abd Al-haleem	e-mail	eng.samer.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Najlaa Ali Hussein	e-mail	eng.najlaaali.hussein@uobabylon.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB0102043	Semester	UGII, 4
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Introduce the principles of heat transfer modes, conduction, convection and radiation. 2. Enable the student to derive the differential equation that governs the heat equations in conduction modes under steady and unsteady state for Cartesian, radial, and spherical coordinates systems. 3. Enable the student to solve one-or two dimensional conduction problem numerically using finite difference method, and analytically using separation variables method. 4. Enable the student to understand the boundary conditions problems. 5. Enable the student to solve lumped system problems 6. Enable the student to classify electromagnetic radiation, and identify thermal radiation. 7. Enable the student to measure experimentally some materials properties, and to design and conduct experiments of heat transfer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Solve and analyze steady conduction problems that involve multilayer rectangular, cylindrical, or spherical geometries and obtain the temperature distribution within a medium and the heat flux. Also evaluate heat conduction in solids with temperature dependent thermal conductivity. 2. Analyze finned surfaces and assess how efficiently and effectively fins enhance heat transfer and solve multidimensional practical heat conduction problems using conduction shape factors. 3. Solve steady and unsteady one- or two dimensional conduction problems numerically using finite difference method. 4. Using Heisler chart in transient heat conduction problems. 5. Calculate radiation heat transfer between black surfaces. 6. Obtain relations for net rate of radiation heat transfer between the surfaces of a two-zone enclosure including two large parallel plates, two long concentric cylinders, and two centering spheres. 7. Be able to apply modern knowledge and to apply mathematics, science, engineering and technology to heat transfer problems and applications. 8. Design and conduct experiments of heat transfer, as well as analyze, interpret data and apply the experimental results for the services.
Indicative Contents المحتويات الإرشادية	1- Introduction (General, Classification of internal combustion engine) [6 hrs] 2-Ideal fuel air cycles, Actual cycles, Engine design and operation parameter (indicated and effective values), Fuel and combustion.

	3-Fundamental of engine design [6 hrs] 4- Spark ignition engine metering and manifold phenomenon [6 hrs] 5- Combustion in spark ignition engine Combustion chamber design in spark ignition engine [6 hrs] 6- Mixture formation in diesel engine Combustion chamber design in compression ignition engine [6 hrs] 7- Gas exchange process [6hrs] 8- Engine heat transfer and cooling system, Engine friction and Lubrication, Two stroke engine, Supercharging and turbocharging, Air pollutions [5hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction (General, Classification of internal combustion engine)
Week 2	Ideal fuel air cycles, Actual cycles
Week 3	Engine design and operation parameter (indicated and effective values) Fuel and combustion
Week 4	Fundamental of engine design
Week 5	Spark ignition engine metering and manifold phenomenon
Week 6	Combustion in spark ignition engine Combustion chamber design in spark ignition engine
Week 7	Mid-term Exam + Steady state multi dim. Conduction; Graphical analogy, shape factor.
Week 8	Mixture formation in diesel engine Combustion chamber design in compression ignition engine
Week 9	Combustion in compression ignition engine
Week 10	Gas exchange process
Week 11	Engine heat transfer and cooling system
Week 12	Engine friction and Lubrication
Week 13	Two stroke engine
Week 14	Supercharging and turbocharging
Week 15	Air pollutions
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: A simplified Study of the basic and systems in the car (engine – parts)
Week 2	Lab 2: lubrication system.
Week 3	Lab 3: Cooling system and cooling loads in P.E
Week 4	Lab 4: Cooling system and cooling loads in D.E.
Week 5	Lab 5: Study of change in loads and speed for four stroke Diesel single cylinder(water cooling)
Week 6	Lab 6: Study of change in loads and speed for two stroke petrol single cylinder (air cooling)
Week 7	Lab 7: Study of change in loads and speed for four stroke petrol single cylinder (air cooling)
Week 8	Lab 8: measuring polluted of soot in D.E
Week 9	Lab 9 measuring polluted in P.E
Week 10	Lab 10: exhaust gas analysis: ORSAT apparatus
Week 11	Lab 11: Determination of the heat balance of the engine
Week 12	Lab 12: determination of internal energy of combustion
Week 13	Lab 13: effect of compression ratio of the performance of P.E
Week 14	Lab 14: effect of compression ratio of the performance of D.E
Week 15	Lab 15: study adiabatic flame temperature
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Richardson stone, Introduction to internal combustion engine, third edition, 1999	Yes
Recommended Texts	Gunter P. Merker, Christian Schwarz, Rudiger Teichmann, Combustion engines Development mixture formation, combustion, emissions and simulation, springer, 2012	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Machine Elements Design		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102052			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		Five
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Essam Zuheir Fadhel		e-mail	eng.osam.zuhair@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Essam Zuheir Fadhel		e-mail	eng.osam.zuhair@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Strength of materials II UOBAB0102045	Semester	UGII:Four
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Cover the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and characteristics of the principal types of mechanical elements. 2. Offer a practical approach to the subject through a wide range of real-world applications and examples. 3. Encourage readers to link design and analysis. 4. Encourage readers to link fundamental concepts with practical component specification. 5. knowing to the ways of choose engineering material and the dimension of the machine. 6. Calculate the stresses in each part of the machine. 7. Suggest the correct solutions for machine design. 8. Knowing on the engineering applications for each part of machine.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will have the ability to determine the loads and calculate the dimensions of the machine parts. 2. Students will be able to determine the loads and calculate the dimensions of mechanical parts that contain holes. 3. Students will have the ability to determine the type of applied loads, whether they are static or dynamic loads. 4. The students intend to have the ability to predict the failure of the structure according to the type of load, static or dynamic load. 5. Understanding how to design the shafts and the keys relative to the static load or the dynamic load. 6. Learn to design the welding joint, rivets and screws according to the applied loads (static or dynamic). 7. The student shall be able to design the spring according to the different applied loads.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Factor of safety, theories of failure and design codes. [5 hrs.] 2. Stress concentration. [6 hrs.] 3. Fatigue. [8 hrs.] 4. Design of Shaft, keys and coupling. [9 hrs.] 5. Design of welded joints. [6 hrs.] 6. Design of Screws and fasteners. [7 hrs.] 7. Spring design. [6 hrs.]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This text is intended for students beginning the study of mechanical engineering design. The focus is on blending fundamental development of concepts with practical specification of components. Students of this text should find that it inherently directs them into familiarity with both the basis for decisions and the standards of industrial components. For this reason, as student's transition to practicing engineers, they will find that this text is indispensable as a reference text.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3, 5, 7, 11	LO # 1, 2, 3, 4 and 5
	Assignments	1	10% (10)	14	LO # 6, 7
	Projects / Lab.	-	-	Continuous	
	Report	1	10% (10)	15	LO # 1-7
Summative assessment	Midterm Exam	2 hrs	10% (10)	8	LO # 1-4
	Final Exam	3 hrs	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to machine design element: Define the machine design element and explain what is the main goal of this subject in a current stage.
Week 2	Characteristics of static and dynamics loading: Explain the differences between static loading and dynamic loading.
Week 3	Safety factor and design cods: Define the safety factor and how can it calculate in static and dynamic loads and explain the journal of the design codes.
Week 4	Stress concentration: Define the stress concentration and explain the foundation of the stress concentration factor in brittle and dynamic materials
Week 5	Failures theories for ductile and brittle materials at static load.
Week 6	Define the cyclic failure and design the members for finite life: Define the fatigue failure and explain the type of dynamic loads also, explain the calculation of life machine member which subjected to cyclic loads.
Week 7	Combined mean and alternating two or more type of stresses and theories of failure in dynamic loads.
Week 8	Mid-term Exam
Week 9	Shaft design for dynamic and static load: Explain and give many examples to design the shaft which key a gear or pulley on it for static and dynamic load.
Week 10	Design of key and the splines: View the types of keys and explain how the stresses for more type of the key can be found. Also calculate the stresses on the splines.
Week 11	Flange coupling: Design each part of the coupling.
Week 12	Design of welded joints: Explain the welded joints which subjected to static and dynamic loads and find the weld size using the theories of failures.
Week 13	Design of mechanical springs: Explain the stresses in springs which subjected to the different loads
Week 14	Design the screws and fasteners: Introduction to the fasteners and the explain the design of screw threads.
Week 15	Stresses in bolts due external load: Explain the stresses in the bolts and nut which subjected (for many type) for static and dynamic loads.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	L. Norton " An Integrated Approach of Machine Design ", Prentice – Hall Inc. 1998.	Yes
Recommended Texts	E. Joseph Shigley "Mechanical Engineering Design ", 8 th Edition, McGraw – Hill Book Company, 2008.	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Manufacturing Processes		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102062			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		Six
Administering Department	Mechanical Engineering	College	Engineering College	
Module Leader	Abdul Kareem Jaleel I Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Module Leader's Acad. Title	Assist.Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Abdul Kareem Jaleel Kadhim		e-mail	eng.abdulkareem.jalil@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Materials UOBAB0102054	Semester	UGIII: Five
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To learn the theory of plasticity, the material characterization and the analytical methods, example applications like rolling, forging, cold forging, bar extrusion. 2. To learn how to identify various manufacturing processes 3. To learn how to select a suitable process (or sequence of processes) for the manufacture of a given component . 4. To learn the fundamentals of forming technology and the corresponding forming machines . 5. To learn how to select engineering material for a required purpose. 6. To learn the fundamentals of sheet metal forming applications like bending, deep drawing, roll forming, incremental forming, hydroforming, hot sheet metal forming, impulse forming. 7. To gain a knowledge and experience of advanced processing and manufacturing techniques. 8. To learn different types of rapid prototype technique.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students would have the ability to analyze both bulk metal deformation (Rolling, Forging, extrusion and drawing) and sheet metalworking (cutting, bending and deep drawing) processes to solve engineering problems. 2. Students would have the ability to Identify and describe the different bulk metal deformation and sheet metalworking processes in terms of machinery, tooling, setup, materials, defects, advantages and disadvantages. 3. Students intended to have the ability of use the theory of metal machining (orthogonal cutting model and Merchant's theory) to solve engineering problems in turning, drilling and milling operations. 4. Students would have the ability to Identify and describe the different modern and advanced manufacturing processes, which are increasingly finding applications in industry for the fabrication of both existing and new products and devices. 5. Students would have the ability to Identify and describe the different types of rapid prototype techniques.
Indicative Contents المحتويات الإرشادية	- Introduction ,Plasticity and stress –strain curve [6 hrs] - Various conventional metal forming processes [20 hrs] - Non- conventional metal forming processes [6 hrs] - Mechanics of metal machining [8 hrs] - Non- conventional metal machining processes [12 hrs] - Rapid prototyping [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and by manufacturing process lab.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3, 5, 7, 11	LO # 1, 2, 3, 4 + 5
	Assignments	1	10% (10)	14	LO # 5
	Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	12	LO # 1-5
Summative assessment	Midterm Exam	2 hrs	10% (10)	9	LO # 1-4
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعية النظرية

	Material Covered
Week 1	Stress- strain and plasticity
Week 2	Hot and cold forming processes

Week 3	Rolling of metal
Week 4	Extrusion process
Week 5	Wire and tube drawing
Week 6	Deep drawing
Week 7	Forging
Week 8	Other metal forming processes
Week 9	Midterm exam
Week 10	High energy rate forming
Week 11	Mechanic of metal cutting and chip formation
Week 12	Power and forces in metal cutting
Week 13	Non -conventional machining process
Week 14	Non -conventional machining process
Week 15	Rapid prototyping
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Conducting tensile test
Week 2	Lab 2: hot and cold forming
Week 3	Lab 3: Rolling of metal experiment
Week 4	Lab 4: study of progressive dies
Week 5	Lab 5: sheet metal forming experiment
Week 6	Lab 6: wire drawing experiment
Week 7	Lab 7: Hydraulic press (deep drawing test)
Week 8	Lab 8: Electromagnetic forming experiment
Week 9	Lab 9 : laser machining
Week 10	Lab 10: Electro discharge machining
Week 11	Lab 11: Abrasive water jet machining
Week 12	Lab 12: material removal experiment
Week 13	Lab 13: types of chips in metal cutting
Week 14	Lab 14: Conducting cutting force experiment
Week 15	Lab 15: three-dimensional printer

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	FUNDAMENTALS OF MODERN MANUFACTURING Mikell P.Groover 2010	No
Recommended Texts	Principles of Metal Manufacturing Processes J. Beddoes & M. J. Bibby 2003	No
Websites	https://libgen.rs/book/index.php?md5=54C9DF3AA2BAD817F43C895864E4787D	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Heat Transfer I		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102053		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of engineering
Module Leader	Rafel Hekmat Hameed	e-mail	Eng.rafel.hekmat@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Rafel Hekmat Hameed	e-mail	Eng.rafel.hekmat@uobabylon.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Thermodynamics, Fluid Mechanics UOBAB0102033,UOBAB0102035	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Introduce the principles of heat transfer modes, conduction, convection and radiation. 2. Enable the student to derive the differential equation that governs the heat equations in conduction modes under steady and unsteady state for Cartesian, radial, and spherical coordinates systems. 3. Enable the student to solve one-or two dimensional conduction problem numerically using finite difference method, and analytically using separation variables method. 4. Enable the student to understand the boundary conditions problems. 5. Enable the student to solve lumped system problems 6. Enable the student to classify electromagnetic radiation, and identify thermal radiation. 7. Enable the student to measure experimentally some materials properties, and to design and conduct experiments of heat transfer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Solve and analyze steady conduction problems that involve multilayer rectangular, cylindrical, or spherical geometries and obtain the temperature distribution within a medium and the heat flux. Also evaluate heat conduction in solids with temperature dependent thermal conductivity. 2. Analyze finned surfaces and assess how efficiently and effectively fins enhance heat transfer and solve multidimensional practical heat conduction problems using conduction shape factors. 3. Solve steady and unsteady one- or two dimensional conduction problems numerically using finite difference method. 4. Using Heisler chart in transient heat conduction problems. 5. Calculate radiation heat transfer between black surfaces. 6. Obtain relations for net rate of radiation heat transfer between the surfaces of a two-zone enclosure including two large parallel plates, two long concentric cylinders, and two centering spheres. 7. Be able to apply modern knowledge and to apply mathematics, science, engineering and technology to heat transfer problems and applications. 8. Design and conduct experiments of heat transfer, as well as analyze, interpret data and apply the experimental results for the services.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: -Modes of heat transfer [3 hrs.]. Conduction, convection, radiation

	-Steady –state conduction one dimensional [6 hrs.] Plane wall, Multilayer conduction, Multilayer cylindrical system heat transfer through composite Wall. - Overall Heat-Transfer Coefficient [2 hrs.] - Critical Insulation Thickness [1 hr.] - Heat Source systems [2 hrs.] - Conduction –convection systems [4 hrs.]. - Steady-State Conduction-Multiple Dimensions [6 hrs.]. Analytical method , Numerical method, shape factor method -Unsteady-state conduction [6 hrs.]. Lumped system, Transient heat flow in a semi-infinite solid, Convection boundary conditions - Transient numerical methods. [3 hrs.]. - Radiation Heat Transfer [4 hrs.]. Physical mechanism, Radiation properties, Black and gray bodies. -Radiation shape factor [4 hrs.]. -Heat exchange between nonblack bodies. [2 hrs.]. - Infinite parallel surfaces [2 hrs.]. -Radiation shields [1 hr.]. -Solar radiation [1 hr.].
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.1
Total SWL (h/sem)	125		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to heat transfer
Week 2	One dim. Steady state conduction in different coordinates systems
Week 3	One dim. Steady state conduction ; Overall heat transfer coefficient , insulation & composite walls.
Week 4	One dim. Steady state conduction ; Critical thickness of insulation, thermal contact resistance, heat source system
Week 5	One dim. Steady state conduction ; Extended surface.
Week 6	Steady state multi dim. Conduction; Analytical solution (separation of variables).
Week 7	Mid-term Exam + Steady state multi dim. Conduction; Graphical analogy, shape factor.
Week 8	Steady state multi dim. Conduction ; Numerical solution.
Week 9	Unsteady state conduction ; Analytical solution, Biot no. , Semi-infinite body.
Week 10	Unsteady state conduction; Lumped heat capacity system, Heisler charts.
Week 11	Unsteady state conduction ; Numerical solution.
Week 12	Radiation ; Introduction, physical mechanism
Week 13	Radiation ; Radiation properties , shape factor
Week 14	Radiation ; Heat exchange between nonblack body, infinite parallel planes
Week 15	Radiation ; Shield , introduction to solar radiation

Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Calibration of Thermocouple.
Week 2	Lab 2: Calibration of Thermocouple.
Week 3	Lab 3: Measuring air temperature under moving conditions.
Week 4	Lab 4: Measuring air temperature under moving conditions.
Week 5	Lab 5: Measurement of liquid temperature.
Week 6	Lab 6: Measurement of liquid temperature.
Week 7	Lab 7: Thermal conductivity of a metal with a cylindrical shape.
Week 8	Lab 8: Thermal conductivity of a metal with a cylindrical shape.
Week 9	Lab 9: Thermal conductivity of a composite metal with a cylindrical shape.
Week 10	Lab 10: Thermal conductivity of a composite metal with a cylindrical shape.
Week 11	Lab 11: Thermal conductivity of liquid and gases.
Week 12	Lab 12: Thermal conductivity of liquid and gases.
Week 13	Lab 13: Determination of Stefan Boltzman's constant.
Week 14	Lab 14: Radiation (Measuring the Emissivity).
Week 15	Lab 15: Radiation (Measuring the Emissivity).

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Heat Transfer"; by J.P. Holman, Ninth Edition, Mc. Graw Hill , 2002.	Yes
Recommended Texts	"Heat and Mass Transfer Fundamentals and Applications"; by Yunus A. Gengel and Afshin J. Ghajar, Fourth Edition, Mc. Graw Hill , 2011.	No
Websites	https://annamalaiuniversity.ac.in/studport/download/engg/mech/oldqp/HMT%20University%20Solved%20Problems.pdf	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Heat Transfer II		Module Delivery	
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102063			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		6
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Rafel Hekmat Hameed		e-mail	Eng.rafel.hekmat@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Rafel Hekmat Hameed		e-mail	Eng.rafel.hekmat@uobabylon.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	NONE	Semester	
Co-requisites module	NONE	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Enable the student to understand the physical mechanism of convection and its classification. 2. Enable the student to derive the differential equations that govern convection on the basis of mass, momentum, and energy balances, and solve these equations for some simple cases such as laminar flow over a flat plate. 3. Enable the student to determine the pressure drop and the average heat transfer coefficient associated with flow across a tube bank for both in-line and staggered configuration. 4. Enable the student to analyze heating and cooling of a fluid flowing in a tube under constant surface temperature and constant surface heat flux conditions. 5. Enable the student to evaluate Nusselt number for both free and force convection associated with vertical, horizontal, and inclined plate as well as cylinder and spheres, in cases of external and internal flows. 6. Enable the student to recognize numerous types of heat exchanger, and classify them. 7. Enable the student to obtain the relations for the logarithmic mean temperature difference, and effectiveness of heat exchanger. 8. Enable the student to conduct experiments on convection and heat exchangers in the laboratory of heat transfer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the module, the student will be able to: 1. Understand the physical mechanism of convection and its classification, and gain a working knowledge of the dimensionless Reynolds, Prandtl, and Nusselt numbers to solve convection problems. 2. Evaluate the drag and heat transfer associated with flow over flat plate for both laminar and turbulent flow. 3. Determine the friction factor and Nusselt number in fully developed turbulent flow using empirical relations, and calculate the pressure drop and heat transfer rate. 4. Derive the governing equations of natural convection, and obtain the dimensionless Grashof number by non-dimensionalizing them. 5. Analyze natural convection inside enclosures such as double-pane windows. 6. Analyze the combined natural and force convection and assess the relative importance of each mode. 7. Develop an awareness of fouling on surface and determine the overall heat transfer coefficient for a heat exchangers, perform a general energy analysis on heat exchangers.

	8. Recognize numerous types of heat exchangers and classify them, know the primary consideration in the selection of heat exchanges. 9. Design and conduct experiments of convection heat transfer and heat exchanger, as well as analyze, interpret data and apply the experimental results for the services.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: - Principles of Convection [4 hrs.] Type of flow, laminar boundary layer of flat plate, thermal boundary layer - Fluid friction and heat transfer, thickness of boundary layer [2 hrs.] - Heat transfer in laminar tube flow [3 hrs.] - Empirical and practical relations for forced-convection heat transfer [8 hrs.] Pipe and tube flow, flow across cylinder and sphere, flow across tube banks - Natural convection systems [8 hrs.] Vertical flat plate, empirical relations for free convection, horizontal cylinder, horizontal plate, inclined surface. - Simplified equations for air [1 hr.] - Free convection in enclosure [2 hrs.] - Mixed convection [4 hrs.] - Heat exchanger [4 hrs.] Over all heat transfer coefficient, fouling factor - Type of heat exchangers [3 hrs.] - Boiler and condenser [2 hrs.] - The log mean temperature difference [3 hrs.] - Effectiveness NTU method [3 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1

Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 4 and 5
	Assignments	2	10% (10)	2, 12	LO # 3, 6 ,7and 9
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 6, 7 and 8
Summative assessment	Midterm Exam	2 hrs	10% (10)	7	LO # 1-6
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Convection
Week 2	Convection; Relation between fluid friction and heat transfer, laminar & turbulent tube flow
Week 3	Forced Convection ; Introduction , empirical & practical relations
Week 4	Forced convection ; Empirical & practical relations , External flow across (flat plate, cylinder & sphere)
Week 5	Forced convection ; External flow across tube banks.
Week 6	Forced convection ; internal flow (laminar & turbulent)
Week 7	Mid-term Exam+ Natural convection; Introduction.
Week 8	Natural convection ; Empirical relations for free conv. for horizontal plane and cylinder
Week 9	Natural convection ; Inclined surface, enclosed surface.
Week 10	Natural convection ; Mixed convection.
Week 11	Heat exchanger ; introduction, Inner & outer over all heat transfer coefficient.
Week 12	Heat exchanger ; Type of heat exchanger.
Week 13	Heat exchanger ; Fouling factors.

Week 14	Heat exchanger ; Analysis of heat exchanger by The log mean temperature differences.
Week 15	Heat exchanger ; Analysis of heat exchanger by Effectiveness NTU method.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Force convection for plane plate
Week 2	Lab 2: Force convection for plane plate
Week 3	Lab 3: Force convection for finned plate.
Week 4	Lab 4: Force convection for finned plate.
Week 5	Lab 5: Free convection for plane plate.
Week 6	Lab 6: Free convection for plane plate.
Week 7	Lab 7: Free convection for finned plate.
Week 8	Lab 8: Free convection for finned plate.
Week 9	Lab 9: Effect of variable input power and flow rate on the coefficient of convection.
Week 10	Lab 10: Effect of variable input power and flow rate on the coefficient of convection.
Week 11	Lab 11: Shell and tube heat exchanger for liquid-liquid.
Week 12	Lab 12: Shell and tube heat exchanger for liquid-liquid.
Week 13	Lab 13: Shell and tube heat exchanger for liquid-gas.
Week 14	Lab 14: Shell and tube heat exchanger for liquid-gas.
Week 15	Lab 15: Cross flow heat exchanger.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Heat Transfer"; by J.P. Holman, Ninth Edition, Mc. Graw Hill , 2002.	Yes
Recommended Texts	"Heat and Mass Transfer Fundamentals and Applications"; by Yunus A. Gengel and Afshin J. Ghajar, Fourth Edition, Mc. Graw Hill , 2011.	No

Websites	https://annamalaiuniversity.ac.in/studport/download/engg/mech/oldqp/HMT%20University%20Solved%20Problems.pdf
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Numerical Analysis and Programming		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102061		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq rehabnoormoh.alkaby@montana.edu rehabnoor@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Rehab Noor Mohammed	e-mail	eng.rehab.mohammed@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Analysis UOBAB0102051	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- Providing students with the fundamentals of numerical analysis by covering the principles of numerical methods and emphasizing the most essential methods that are used to solve problems in science and engineering fields. 2- Enhancing students' programming skills using the MATLAB environment to implement algorithms and giving them the opportunity to develop and present their own projects to prepare them for future courses in their areas of specialization. 3- Helping students to understand the new mathematical approaches for approximating the underlying problems involving interpolation, numerical solutions of linear systems, approximation of eigenvalues and eigenvectors, numerical solutions of initial value problems and ordinary differential equations, and numerical differentiation using finite difference approximation method.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Students are effectively able to analyze, understand the mathematical basis, and write the mathematical solution of any problem related to the subjects listed above in an obvious manner. 2- Students are also capable of writing efficient programs and scripts for any homework or class assignments, and their writing of any code is fastest and easy to follow. 3- Students are successfully able to work with each other to complete class assignments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Interpolation using a single polynomial [1 hrs]. - Lagrange interpolating polynomials [2 hrs]. - Newton's interpolating polynomials [2 hrs]. - Piecewise (spline) interpolation [1 hrs]. - Linear splines [2 hrs]. - Quadratic spline [2 hrs]. - Solving a system of linear equations using [8 hrs]: Gauss elimination method, Gauss-Jordan elimination method, inverse of a matrix, and Gauss-Seidel iterative method. - Eigenvalues and eigenvectors method [2 hrs]. - Ordinary differential equations: initial value problems [6 hrs]: Euler's method, Modified Euler's method, and Runge-Kutta methods. - Numerical differentiation using Finite difference approximation [6 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Providing Lectures supported by sufficient examples to make a clear realization of the material and its mathematical and physical concepts. Reviewing the basics of MATLAB software and presenting computer facilities. Improving understanding of numerical methods by allowing a classroom discussion, asking and answering questions, and asking students to carry out some steps of numerical methods by hand. Developing students' programming skills by asking them to write computer programs, i.e., script files or user-defined functions, and comparing the numerical results of their code and manual results that have been achieved by their hand.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	8	1, 2, and 3
	Assignments	5	10% (10)	3, 5, 7, 9, and 11	1, 2, and 3
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	12	
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	1, 2, and 3
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Background about numerical methods and MATLAB software
Week 2	Interpolation using Lagrange polynomials
Week 3	Newton's interpolating polynomials
Week 4	Linear spline interpolations
Week 5	Quadratic spline interpolations
Week 6	Gauss elimination method
Week 7	Gauss-Jordan elimination method
Week 8	Inverse of matrix method
Week 9	Gauss-Seidel iterative method
Week 10	Eigenvalues and eigenvectors method
Week 11	Midterm Exam / Euler's method
Week 12	Modified Euler's method
Week 13	Runge-Kutta method
Week 14	Finite difference formulas using Taylor series expansion
Week 15	Numerical differentiations using finite difference method
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Presenting MATLAB software and computer facilities
Week 2	Lab 2: Introducing new undefined functions and executing examples using Lagrange polynomials
Week 3	Lab 3: Executing examples using Newton's interpolating polynomials
Week 4	Lab 4: Defining a new function and executing examples using linear spline interpolation
Week 5	Lab 5: Executing examples using quadratic spline interpolation
Week 6	Lab 6: Defining new functions and executing examples using Gauss elimination method
Week 7	Lab 7: Executing examples using Gauss-Jordan elimination method with explaining new functions
Week 8	Lab 8: Executing examples using inverse of matrix method
Week 9	Lab 9: Defining a new function and executing examples using Gauss-Seidel iterative method

Week 10	Lab 10: Executing examples using eigenvalues and eigenvectors method
Week 11	Lab 11: Defining a new function and executing examples using Euler's method
Week 12	Lab 12: Executing examples using modified Euler's method
Week 13	Lab 13: Executing examples using Runge-Kutta method
Week 14	Lab 14: Defining new functions and executing examples using finite difference formulas
Week 15	Lab 15: Executing examples using finite difference method to solve differential equations

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Griffiths, Smith, I. M., & Smith, I. M. (Ian M. (2006). <i>Numerical methods for engineers</i> (2nd ed.). Chapman & Hall/CRC. - Cheney, Kincaid, D., & Kincaid, D. (David R. (2004). <i>Numerical mathematics and computing</i> (5th ed.). Brooks/Cole-Thomson Learning.	No
Recommended Texts	- Esfandiari. (2013). <i>Numerical methods for engineers and scientists using MATLAB®</i> (First edition.). CRC Press, an imprint of Taylor and Francis. - Deuflhard, Deuflhard, P., & Hohmann, A. (2003). <i>Numerical analysis in modern scientific computing: an introduction</i> (Deuflhard & A. Hohmann, Eds.; Second Edition.). Springer.	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Project Management		Module Delivery
Module Type	Elective		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOBAB0102067		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	
Administering Department	Mechanical Engineering	College	Engineering College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Teaching project management in undergraduate mechanical engineering classes can have several goals and outcomes, including: 1. Enhancing students' understanding of project management principles and practices: By teaching project management in undergraduate mechanical engineering classes, students can develop a solid understanding of project management tools and techniques, including project planning, scheduling, risk management, cost management, and quality management. 2. Developing students' project management skills: By engaging in hands-on project management activities and exercises, undergraduate mechanical engineering students can develop their project management skills, including leadership, communication, collaboration, problem solving, and decision making. 3. Preparing students for future careers: Many mechanical engineering careers involve managing projects, whether it's designing and building a new product, managing a manufacturing process, or overseeing a construction project. By teaching project management in undergraduate mechanical engineering classes, students can develop the skills and knowledge they need to succeed in these roles. 4. Improving project outcomes: By teaching project management in undergraduate mechanical engineering classes, students can learn how to effectively plan, manage, and control projects, which can lead to improved project outcomes, including better quality, reduced costs, and shorter project timelines. Overall, teaching project management in undergraduate mechanical engineering classes can help students develop the skills and knowledge they need to succeed in mechanical engineering careers that involve managing projects. It can also help improve project outcomes and contribute to the success of engineering projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Here are some potential learning outcomes of teaching project management in mechanical engineering: 1. Students will be able to apply project management principles and tools to plan, execute, and control mechanical engineering projects. 2. Students will be able to develop project schedules, budgets, and resource plans, and track project progress against these plans. 3. Students will be able to identify and manage project risks and uncertainties, and develop contingency plans to address them. 4. Students will be able to develop and manage project teams, and effectively communicate with stakeholders. 5. Students will be able to apply quality management principles and tools to ensure that mechanical engineering projects meet stakeholder requirements and expectations.

	6. Students will be able to apply ethical principles and professional standards to project management decisions and actions. 7. Students will be able to analyze project performance data and use it to make informed decisions and take corrective actions. 8. Students will be able to prepare project reports and presentations, and effectively communicate project results to stakeholders. 9. Students will be able to work effectively in project teams, and develop leadership and teamwork skills. 10. Students will be able to apply project management software tools to manage projects and analyze project data. These learning outcomes can help undergraduate mechanical engineering students develop the skills and knowledge they need to succeed in project management roles in the mechanical engineering field.
Indicative Contents المحتويات الإرشادية	- project management principles and practices [13hrs] - hands-on project management activities and exercises [13 hrs] - Static analysis for solving for the boundary conditions [10 hrs] - quality management principles [13 hrs] - analyze project performance data [13 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the theoretical and practical aspects, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes of project management.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3, 5, 7, 11	LO # 1, 2, 3, 4 and 5
	Assignments	1	10% (10)	14	LO # 1, 2, 3, 4, 5, and 6
	Lab.	-	-	-	
	Report	1	10% (10)	15	LO # 1-15
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-8
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to project management
Week 2	Project scope and requirements
Week 3	Project planning and scheduling
Week 4	Project budgeting and cost management
Week 5	Project risk management
Week 6	Project quality management
Week 7	Mid-Term Examination
Week 8	8. Project communication and stakeholder management
Week 9	Project leadership and ethics
Week 10	Project closure and evaluation
Week 11	Project procurement and vendor management
Week 12	Agile project management methodologies
Week 13	Program management and portfolio management
Week 14	Project management software tools
Week 15	Project management in different industries
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–seventh Edition (2021)	No
Recommended Texts	Project Management: The Managerial Process (Mcgraw-Hill Series Operations and Decision Sciences) 7th Edition (2017)	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Turbomachine		Module Delivery	
Module Type	E		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102056			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		5
Administering Department	Mechanical Engineering.	College	College of Engineering	
Module Leader	Farooq Hassan Ali		e-mail	eng.farooq.hassan@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	M. Sc.	
Module Tutor	Farooq Hassan Ali		e-mail	eng.farooq.hassan@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	31/5/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics (UOBAB0102033, UOBAB0102035)	Semester	UGIII,5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. This module aims to teach engineering students about the concept of Turbo-machinery. 2. Students have knowledge about the types of impellers, compressors and turbines. 3. This module also teaches the student the basic related calculations in different types of impellers, compressors and turbines. 4. This module also aims to introduce important information on the basic designs consideration of impellers, compressors and turbines. 5. This module helps students to improve their higher-level thinking skills, including critical thinking and creativity and solving calculated problems precisely without mistakes. 6. This module improves students' skills in solving the calculations of turbomachinery problems to be ready to study the subject of Power plants (ENME483) in the eighth semester of study. 7. This module provides important information to prepare the mechanical engineer for actual applications of turbine machines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students have knowledge in turbomachines and its classifications. 2. Students have knowledge about the basic concept of Euler's equation for turbomachinery. 3. Students have ability to find the inlet and outlet velocity vector triangles and efficiency. 4. Students have knowledge about the centrifugal compressor; performance map, preliminary design of impeller and diffuser. 5. Students able to find the slip factor and impeller back sweep. 6. Students have knowledge about the Radial turbine and performance map. 7. Students have knowledge about the basic concept of Preliminary design of rotor and nozzle. 8. Students have knowledge about the nominal design condition, velocity ratio, mechanical and material considerations. 9. Students are able to find the isentropic and polytropic efficiency. 10. Students have knowledge about the cascade airfoil geometry and the flow characteristics and performance of the cascade. 11. Students have knowledge about the axial turbines & compressors and how to find the velocity triangles, 12. Students have knowledge about the basic concept of the stage design parameters, repeating stages and how to find the losses & efficiency. 13. Students have knowledge about the Reaction, Smith chart, transonic compressors, stall and surge. 14. Students have knowledge about the introduction of cavitation.
Indicative Contents المحتويات الإرشادية	1) Introduction and classification of turbomachines [3hrs] 2) Euler's equation for turbomachinery [5hrs] 3) Inlet and outlet velocity vector triangles, Concepts of efficiency. [5hrs] 4) Centrifugal compressor; performance map, preliminary design of impeller and diffuser. [5hrs] 5) Slip factor, impeller back sweep. [3hrs] 6) Radial turbine; performance map. [5hrs] 7) Preliminary design of rotor and nozzle. [5hrs] 8) Nominal design condition, velocity ratio, mechanical and material considerations. [5hrs] 9) Isentropic and polytropic efficiency. [5hrs] 10) Cascade airfoil geometry. Cascade testing, flow characteristics and performance [3hrs] 11) Axial turbines & compressors – velocity triangles. [5hrs] 12) Stage design parameters, repeating stages, losses & efficiency [5hrs] 13) Reaction, Smith chart, transonic compressors, stall and surge. [5hrs] 14) Introduction to cavitation. [3hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and show the video scenes explaining the manufacturing process and method of work.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 9	LO # (1-4) LO# (5-8)
	Assignments	2	10% (10)	5, 9	LO #1(1-4) LO# (5-8)
	Projects / Lab.	-	-		
	Report	1	10% (10)	14	LO # (12)
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # (1-9)
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and classification of turbomachines
Week 2	Euler's equation for turbomachinery
Week 3	Inlet and outlet velocity vector triangles, Concepts of efficiency
Week 4	Centrifugal compressor; performance map, preliminary design of impeller and diffuser
Week 5	Slip factor, impeller back sweep.
Week 6	Radial turbine; performance map,
Week 7	Preliminary design of rotor and nozzle
Week 8	Nominal design condition, velocity ratio, mechanical and material considerations.
Week 9	Isentropic and polytropic efficiency
Week 10	Mid-term Exam
Week 11	Cascade airfoil geometry. Cascade testing, flow characteristics and performance
Week 12	Axial turbines & compressors – velocity triangles.
Week 13	Stage design parameters, repeating stages, losses & efficiency
Week 14	Reaction, Smith chart, transonic compressors, stall and surge
Week 15	Introduction to cavitation.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered (There is no Lab.)
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:
Week 8	Lab 8:
Week9	Lab 9:
Week10	Lab 10:
Week11	Lab 11:

Week 12	Lab 12:
Week 13	Lab 13:
Week 14	Lab 14:
Week 15	Lab 15:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Gas Turbine Theory 6th Ed, Saravanamuttoo, Rogers, Cohen and Straznicky, ISBN-10: 0132224372	Yes
	Fluid Mechanics and Thermodynamics of Turbomachinery 7th Edition, Dixon and Hall, Elsevier Science & Technology, ISBN: 978-0-12-415954-9	Yes
	A Text Book of Fluid Machinery	Yes
Recommended Texts	1- Fluid Mechanics and Machinery: https://india.oup.com/product/fluid-mechanics-and-machinery-9780195699630 2. Fluid Mechanics and Machinery 1st Edition: https://www.amazon.com/Fluid-Mechanics-Machinery-C-S-P-Ojha/dp/0195699637 3. Fluid mechanics and hydraulic machines: https://mechanicalbasics.com/fluid-mechanics-and-hydraulic-machines/	No
Websites	Electronic resources available through the library's website:	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Gas Dynamic		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102065			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		6
Administering Department	Mechanical Engineering.	College	College of Engineering	
Module Leader	Farooq Hassan Ali		e-mail	eng.farooq.hassan@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	M. Sc.	
Module Tutor	Farooq Hassan Ali		e-mail	eng.farooq.hassan@uobabylon.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.	
Scientific Committee Approval Date	1/6/2023	Version Number	1.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	UOBAB0102033,UOBAB0102035		Semester	UGII:3
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To introduce the fundamental concepts and governing equations of fluid mechanics, using mathematical techniques to analyse simple flow problems for an inviscid (frictionless) fluid. This course is designed to introduce seniors and beginning graduate students to the fundamentals of compressible fluid flow, with an emphasis on a wide variety of steady, one-dimensional flow problems and a general understanding of the principles of multi-dimensional flow.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Fluid dynamics plays a central role in many natural phenomena. As we breathe, gas flows in and out of our lungs, whilst our heart pumps blood around the body. Without a proper understanding of large-scale fluid flows in the Earth's atmosphere and oceans, it would be impossible for meteorologists to produce reliable weather forecasts. On yet larger scales, the complex motions in the Earth's molten iron core are responsible for sustaining the terrestrial magnetic field. The principles of fluid dynamics can also be used to explain aerodynamic lift, whilst engineers need to be able to model fluid flows around solid bodies (like tall buildings) and along pipes. This module will introduce the concept of a fluid, and the ways in which the motions of such a system can be described. The main focus of this module will be on the dynamics of inviscid (frictionless) fluids. Even with such an assumption, it is not possible to write down a general solution of the governing equations, but it is possible to make certain simplifying assumptions to deduce the properties of certain flows. In many respects, this module is a sequel to vector calculus (MAS2801/PHY2026). Many of the ideas that were introduced in that module, including the differential operators and integral theorems, will be used extensively.
Indicative Contents المحتويات الإرشادية	Review of fluid properties, dimensional analysis, kinematics of fluid motion. [5hrs] Equations of mass, momentum and energy conservation, integral and differential formulation [5hrs] Relation between vorticity and entropy generation, wave propagation in compressible flows. [6hrs] One-dimensional gas dynamics, area-velocity relation [5hrs] Isentropic flows, choking, normal shock, nozzles and diffusers [8hrs] Piston problems and shock, nozzles and diffusers. Piston problems and shock tubes, converging-diverging nozzles. Oblique shock waves and Prandtl-Meyer expansions [5hrs] Over and under expanded flows. Supersonic nozzles and diffusers [5hrs] Nozzles for propulsion and wind tunnels, supersonic airfoils, wave drag. [8hrs]. Flows with friction and heat transfer, Fanno and Rayleigh lines [5hrs] Small perturbation theory, application to jet flows, internal and external flows [5hrs] Method of characteristic, computation procedure, applications [5hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,
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	interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	Part A LO #1, 2,3,4,5,6,7, and 8 Part B LO#1,2,3,4,5,6,7,8,and 9
	Assignments	2	10% (10)	2, 12	Part A LO #1, 2,3,4,5,6,7, and 8 Part B LO#1,2,3,4,5,6,7,8,and 9

	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Part A LO # 3, 8,4 and 6 Part B LO#1,2,3,4,5,6,11,12,13 ,and 14
Summative assessment	Midterm Exam	1 hr	10% (10)	7	Part A LO # 1-11 Part B LO#1-11
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fluid properties
Week 2	Equations of mass
Week 3	Momentum and energy
Week 4	One-dimensional gas dynamics
Week 5	Normal and oblique shocks
Week 6	Expansion fans
Week 7	Mid term Exam
Week 8	Flow with friction ,Flows in ducts and nozzles
Week 9	Flow with heat transfer
Week 10	Small perturbation theory
Week 11	Oblique shocks
Week 12	Prandtl-Meyer expansions
Week 13	Over and under expanded flows
Week 14	Supersonic nozzles and diffusers
Week 15	Introduction to characteristic method.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Subsonic Wind Tunnel

Week 2	Lab 2: Supersonic Wind Tunnels
Week 3	Lab 3: Inlet/Bypass Transonic Wind Tunnel
Week 4	Lab 4: Diagnostics and Instrumentation
Week 5	Lab 5: Model Assembly/Machine Shop
Week 6	Lab 6: Distributed Propulsion Flight Control Testbed
Week 7	Lab 7: Airfoil Dynamic Stall Vortex Formation Physics
Week 8	Lab 8: Span load Optimization for Minimum Wing Drag
Week9	Lab 9: High Pressure and High-Volume Compressed Air Systems
Week10	Lab 10: Axisymmetric Jet Anechoic Chamber Facility Axisymmetric
Week11	Lab 11: Advanced Flow Diagnostics
Week 12	Lab 12: Tomographic PIV of Compressible Base Flow
Week 13	Lab 13: Compressible Shear Layer
Week 14	Lab 14: Plasma Flow Control of Compressible Base Flow
Week 15	Lab 15: Axisymmetric Under expanded Jet Fluid/Structure Interaction
Week 16	Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Compressible Fluid Flow (2nd Edition) 2nd Edition by Michel A. Saad Rathakrishnan E. 2010. <i>Applied Gas Dynamics</i>. New York: John Wiley & Sons. [Available at the Circulation Collection (QC168. R38 2010), UPRM General Library]	Yes
Recommended Texts	1- Benedict, Robert P. 1982. <i>Fundamentals of Gas Dynamics</i>. New York: John Wiley & Sons. [Available at the Circulation Collection (QC 168. B448 1983), UPRM General Library] (**) 2. Zucker R.D., O. Biblarz. 2002. <i>Fundamentals of Gas Dynamics</i>. New York: John Wiley & Sons. (**) 3. Liepmann H.W. and Roshko A. 2002. <i>Elements of Gas Dynamics</i>, New York: Dover Publications. 4. Kreith, Frank. 1999. <i>CRC Handbook of Thermal Engineering</i>. Florida: CRC Press. http://dx.doi.org/10.1201/9781420050424. [Available via MechanicalENGINEERING netBASE, UPRM General Library Databases] (*)	No

Websites	Electronic resources available through the library's website:	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electrical Machines		Module Delivery	
Module Type	S		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB0102064			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		6
Administering Department	Mechanical Engineering	College	Engineering	
Module Leader	Farah Fahem Hussein		e-mail	eng.farah.fahem@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Master	
Module Tutor	Farah Fahem Hussein		e-mail	eng.farah.fahem@uobabylon.edu.iq
Peer Reviewer Name	NA	e-mail	NA	
Scientific Committee Approval Date	31/05/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A	Semester	N/A
Co-requisites module	N/A	Semester	N/A

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Provide students with magnetic circuit analysis related to the machine theory. 2. Provide students with an in-depth knowledge concerning DC Machines construction and principles of operation. 3. Supplement information on generating and motoring actions of DC Machines. 4. Provide students with information on steady state operation of DC machines whether generating or motoring. 5. Study electrical and mechanical characteristics of different types of DC Machines. 6. Study power flows and efficiency calculations of DC machines. 7. To provide practical insight of theoretical materials through a set of related experiments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students are able to provide a description of each type of DC machines and be able to understand the principles of operation. 2. Gain the skills to compare between different types of DC machines and have the ability to determine a particular type for a specific application. 3. Students are able to explain the characteristics of machines whether it is a motor or a generator. 4. Students have the skills to analyze steady state models of DC generators and motors. 5. Students have the knowledge to design the required ratings of a generator or motor and able to fully understand losses in various parts of the machine. 6. Students have the ability to set up practical circuit to obtain characteristics of DC machines practically. 7. Students will have the ability to explain and justify any discrepancies between practical results and theoretical ones.
Indicative Contents المحتويات الإرشادية	1. Magnetic circuits [4 hrs]. 2. Basic architecture of DC machines. [5 hrs]. 3. Induced EMF in DC machine, function of commutator, armature winding [5 hrs]. 4. types of armature windings. [5 hrs]. 5. Steady state analysis of DC generators. [5 hrs]. 6. MMF distribution, calculations of MMF per pole, armature reaction, commutation, compensation windings and inter-poles. [6 hrs]. 7. Introduction to DC generators, general equation of induced EMF, types of DC generators according to excitation, [4 hrs].

	8. Characteristics of DC generators (open circuit and load characteristics) for each type of DC generator (shunt, series, compound and separately excited). [4 hrs]. 9. Introduction to power flow in DC generators, type of losses and efficiency calculations for DC generator. [4 hrs]. 10. Introduction to DC motors, principle of operation, back EMF, general equation of induced torque, types of DC motors. [4 hrs]. 11. Characteristics of DC motors, speed vs. armature current and torque vs. armature current. [4 hrs]. 12. Characteristics of DC motors, speed vs. armature current and torque vs. armature current. [4 hrs]. 13. Voltage control and field control methods. [4 hrs]. 14. Speed control of DC motor, the need for speed control system, armature control. [4 hrs].
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and lab experiments.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,9 & 12	LO # 3 and 4, 8 and 9
	Assignments	3	10% (10)	4,10 & 11	LO # 4 and 5, 10 and 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr.	10% (10)	8	LO # 1-5
	Final Exam	3 hrs.	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Review of magnetic circuits, magnetic quantities.
Week 2	Magnetic cores, reluctance calculations, with airgaps, determination of required excitation, solenoids, magnetic circuit, examples.
Week 3	Introduction to rotating machines, principle of operation for rotating machines, basic construction of DC machines, familiarization with DC machine parts.
Week 4	Induced EMF in DC machine, function of commutator, armature winding, and types of armature windings.
Week 5	MMF distribution, calculations of MMF per pole, armature reaction, commutation, compensation windings and inter-poles.
Week 6	Introduction to DC generators, general equation of induced EMF, types of DC generators according to excitation,
Week 7	Characteristics of DC generators (open circuit and load characteristics) for each type of DC

	generator (shunt, series, compound and separately excited).
Week 8	One hour & midterm test. Parallel operation of DC generators, conditions for parallel operation, load current sharing in parallel connection.
Week 9	Introduction to power flow in DC generators, type of losses and efficiency calculations for DC generator.
Week 10	Introduction to DC motors, principle of operation, back EMF, general equation of induced torque, types of DC motors.
Week 11	Characteristics of DC motors, speed vs. armature current and torque vs. armature current. Part 1
Week 12	Characteristics of DC motors, speed vs. armature current and torque vs. armature current. Part 2
Week 13	Power flow in DC machines, efficiency calculations and losses.
Week 14	Voltage control and field control methods.
Week 15	Speed control of DC motor, the need for speed control system, armature control.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Familiarization with lab equipment and safety precautions/measures.
Week 2	Magnetization characteristic of DC shunt generator
Week 3	Load test on DC shunt generator.
Week 4	Load test on DC series generator
Week 5	Load test on DC compound generator
Week 6	Field test on dc series generator.
Week 7	Load test on DC shunt motor
Week 8	Load test on DC shunt motor
Week 9	Speed control of dc shunt motor
Week 10	Swinburne's test of dc shunt motor
Week 11	Hopkinson's test on dc shunt machines

Week 12	Brake test on a dc shunt motor
Week 13	Brake test on dc compound motor
Week 14	Magnetization characteristic of dc shunt generator by using digital simulation.
Week 15	Review for final Exam
Week 16	End of Semester Exam/ Theoretical + practical parts

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<i>Electric Machinery Fundamentals, Fifth edition, 2012 by Stephen J. Chapman.</i>	Yes
Recommended Texts	1. <i>Electrical Machinery, 2003 6th Edition by Fitzgerald, Kingsley, and Umans.</i>	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
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	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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