

2025-2026

First semester



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	CALCULUS		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	AIC1102				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	Semester of Delivery		1
Administering Department			College	Type College Code	
Module Leader	AHMED ALHAMADANI		e-mail	AHMED@coeng.uobaghdad.edu.iq	
Module Leader’s Academic Title			Module Leader’s Qualification		
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		20/01/2026	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Basic Calculus Concepts: Introduce limits, derivatives, and integrals. 2. Problem-Solving Skills: Teach students how to use differential and integral calculus to solve problems. 3. Real-World Applications: Demonstrate how calculus is used in physics, engineering, and economics. 4. Preparation for Advanced Mathematics: Prepare students for more advanced math courses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Limit Calculation: Compute limits and interpret the behavior of functions. 2. Differentiation: Determine rates of change and solve optimization problems. 3. Integration: Employ methods for calculating areas under curves and solving simple differential equations. 4. Mathematical Writing: Clearly express mathematical concepts in writing. 5. Critical Thinking: Analyze complex problems using calculus.
Indicative Contents المحتويات الإرشادية	1. Introduction to Calculus: Overview of its history and real-life applications. 2. Understanding Limits and Continuity: Learn to evaluate limits and grasp continuity. 3. Differentiation Methods: Explore product, quotient, and chain rules. 4. Using Derivatives: Identify critical points, perform optimization, and analyze curves. 5. Integration Methods: Cover substitution, integration by parts, and basic integral calculations. 6. Fundamental Theorem of Calculus: Understand the relationship between differentiation and integration for calculating areas. 7. Applications of Integration: Calculate areas between curves and explore physical applications. 8. Introduction to Differential Equations: Learn the basics of solving simple differential equations for modelling purposes.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lectures on Effective Time Management
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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
اسم الجامعة
بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



الإستراتيجيات	- Conduct structured sessions emphasizing time management's critical role in academic and professional settings. These sessions will explore proven strategies for enhancing personal productivity, including task prioritization, overcoming procrastination, and using practical time-tracking tools. 2. Collaborative Group Work - Implement group-based assignments to strengthen teamwork, communication, and collective problem-solving abilities. By promoting peer collaboration, the program enhances understanding and cultivates a shared commitment to achieving educational objectives. 3. Integration of Accessible Online Resources - Leverage user-friendly digital platforms and online courses to support ongoing skill development and reinforce course content. Provide access to a wide range of learning materials, ensuring flexible, independent learning and continuous ..engagement beyond the traditional classroom environment
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental Number Theory and Inequalities Overview of the properties of real numbers and principles of inequalities.
Week 2	Intervals and Absolute Values Study of interval notation and absolute values, as well as strategies for solving inequality problems.
Week 3	Coordinate Geometry and Inclination Application of the Cartesian coordinate system and concepts of angle inclination in geometry.
Week 4	Functions Definition, classification, and operations involving functions, including their domain and range.
Week 5	Properties of Limits Examination of limits, basic limit laws, and their applications.
Week 6	Continuity Analysis of function continuity and criteria for assessing it.
Week 7	Mid-Term Examination and Discussion Evaluation of material from Weeks 1 to 6 and a review session.
Week 8	Trigonometric Functions Overview of trigonometric functions, their identities, and applications.
Week 9	Derivative Rules Review differentiation rules for polynomials, exponential, and logarithmic functions.
Week 10	Trigonometric Derivatives Exploration of differentiation rules for trigonometric functions and their inverses.
Week 11	Applications of Derivatives Introduction to L'Hôpital's Rule, understanding increasing and decreasing functions, and concavity.
Week 12	Extreme Value and Mean Value Theorems Discussion of essential calculus theorems related to real-world optimization.
Week 13	Integration Overview of fundamental principles and techniques of integration.
Week 14	The First Fundamental Theorem of Calculus An explanation of the relationship between integrals and derivatives is illustrated with examples.
Week 15	Review Comprehensive review of all topics in preparation for the end-of-term assessment.
Week 16	Final Examination A comprehensive assessment covering all topics from the course.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
اسم الجامعة
بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources		
مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
اسم الجامعة
بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



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

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠,٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤,٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤,٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	English 1		Module Delivery		
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	UOB102				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UG1	Semester of Delivery		1
Administering Department		AIAE	College	AIC	
Module Leader	Anfal Mudhafar Ali		e-mail	anfal.m@csu.uobaghdad.edu.iq	
Module Leader’s Academic Title		Lecturer assistant	Module Leader’s Qualification		M.A.
Module Tutor	Name (if available)		e-mail	E-mail	
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 Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1- The program aims to enable students to understand, write, comprehend and speak English in a way that allows them to interact with English speakers. 2- In addition, it aims to improve the students reading and writing skills in the language of scientific research, in a way that enables them to pursue the latest research and discoveries in discreet international journals, as well as it qualifies them to communicate with their peers in international universities through English language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the semester, the student will be able to 1. Apply grammatical rules of English accurately in both written and spoken communication. 2. Demonstrate proficiency in reading comprehension, speaking, listening, and writing skills through various academic and practical tasks. 3. Communicate effectively in English by engaging in conversations, expressing ideas clearly, and adapting language appropriately to different audiences and contexts. 4. Compose well-structured written texts that are coherent, persuasive, and appropriate for their intended purpose and audience.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to English tenses, grammar [7 hrs] Using the present and past tenses and the differences between them [7 hrs] How to write the English sentence. Types of sentences [4 hrs] How to read aloud and the skills of comprehension and how to organize the ideas to answer reading questions. [7 hrs] Revision problem classes [5 hrs] Total hrs = 30 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الاستراتيجيات	Students are taught through communicative approach through which they are encouraged to speak even if they make mistakes. 1. Interactive Lectures: Using visual tools such as slides, videos, and records 2. Problem-Based Learning (PBL): a linguistic question is presented, requiring students to analyze it according to what they understood from the lecture. This method is used to enhance creative thinking technique for students and generate new ideas to solve problems through spontaneous contributions (brainstorming). 3. Blended Learning: Combining e-learning techniques with traditional education by using remote learning platforms where students can access lectures materials, additional learning materials, and submit assignments online.
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	- Self-Assessment and Feedback: Encouraging students to assess their colleague's performance through continuous feedback from the instructor, to enhance self-critique and personal analysis skills. - Collaborative Learning: Using teamwork as an educational strategy through small groups to solve linguistics problems, fostering social interaction and developing communication skills - Project-Based Learning: Offering students the chance to work on long-term projects that require research, preparing information in an organized well written report, and presenting their work in front of their class to enhance their speaking abilities. These projects can be individual or group-based, enhancing research and teamwork skills
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quiz	2	10% (10)	5&9	LO #1, #2 and #3
	Assignments	4	5% (5)	3,5,8 & 12	LO #1, #2
	participation in lecture	5	5% (4)	Continuous	All
	Portfolio	1	10% (10)	13	LO #2 & #3
	Project	1	10% (10)	9-15	LO #3 & #4
Summative assessment	Midterm Exam	2hr	10% (10)	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	Introduction to verb <i>to Be</i> , Possessive, making plural nouns
Week 2	Present simple, Adverbs of frequency, adjectives, Question words,
Week 3	Pronouns, this/that, there, indefinite & definite articles, Expression of quantity
Week 4	Was/ were, Past simple, irregular verbs, Prepositions
Week 5	Quiz/ Modal verbs, have to, like & would like.
Week 6	Present continuous, Present simple and Present continuous, Future plans.
Week 7	Midterm/ Tenses, state verbs
Week 8	Future, adverbs.
Week 9	Quiz/ Present perfect, The Passive
Week 10	Time clauses, Conditionals, Participles
Week 11	Present perfect continuous, verb Patterns, infinitives.
Week 12	Past perfect, Noun phrases, Reflexive pronouns
Week 13	Reported Speech, Relative clauses
Week 14	Project Presentation
Week 15	Project Presentation
Week 16	Final



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Plus by Liz and John Soras- Beginner, Oxford University Press.	Yes
Recommended Texts	English Grammar in Use by Raymond Murphy.	Yes
Websites	https://elt.oup.com/student/headway/beg/ https://test-english.com/	

Grading Scheme

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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد
بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Critical Thinking		Module Delivery	
Module Type	Basic		☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	AIC1103			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		Semester of Delivery		
Administering Department		Type Dept. Code	College	Type College Code
Module Leader	Faisel Ghazi Mohammed		e-mail	faisel.mohammed@sc.uobaghdad.edu.iq
Module Leader’s Acad. Title		Professor	Module Leader’s Qualification	
Module Tutor			e-mail	
Peer Reviewer 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 Objectives أهداف المادة الدراسية	1. The program aims to equip students with the ability to analyze information critically, enabling them to assess arguments and evidence effectively in various contexts. 2. Additionally, it seeks to enhance students' skills in articulating their thoughts clearly and logically, fostering the ability to engage in constructive dialogue and make informed decisions based on sound reasoning.



Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. At the end of the semester, the student will be familiar with essential principles of critical thinking and how to apply them in analyzing arguments and evaluating evidence. 2. At the end of the semester, the student will enhance their skills in identifying logical fallacies, constructing coherent arguments, and engaging in reasoned discussions. 3. The ability to approach problems analytically and creatively, enabling the student to formulate questions, assess information, and draw well-supported conclusions. 4. ☐ Understanding the techniques for effective decision-making, including how to weigh options and consider the implications of various choices.
Indicative Contents المحتويات الإرشادية	Part A – Theory • Introduction to Critical Thinking concepts and importance [7 hrs] • Identifying arguments, premises, and conclusions; evaluating reasoning [7 hrs] • Analyzing common logical fallacies and biases [4 hrs] • Developing skills in questioning assumptions and evidence evaluation [7 hrs] • Practice sessions and problem-solving workshops [5 hrs] Part B - Practical • Applying critical thinking to real-life scenarios and case studies [7 hrs] • Group discussions and debates to practice argumentation skills [6 hrs] • Exercises on identifying logical fallacies in media and texts [5 hrs] • Problem-solving tasks requiring evidence-based decision making [6 hrs] • Presentation of critical analysis on selected topics [6 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Students are taught through an interactive approach that encourages open discussion and the exploration of diverse viewpoints. 1. Interactive Lectures: Utilizing multimedia tools such as presentations, videos, and discussions to engage students in critical analysis of topics. 2. Case Study Analysis: Presenting real-world scenarios that require students to evaluate information critically, fostering practical application of critical thinking skills. 3. Socratic Method: Encouraging dialogue through questioning, where students are prompted to think deeply and articulate their reasoning, enhancing their analytical abilities. 4. Reflective Writing: Assigning written reflections on readings and discussions to help students articulate their thought processes and engage in self-assessment of their reasoning. 5. Group Discussions: Facilitating small group discussions that allow students to share perspectives and challenge each other's viewpoints, promoting collaborative critical thinking. 6. Debate and Argumentation: Organizing structured debates on various topics to help students develop their argumentation skills and learn to defend their positions with logical reasoning.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	36	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	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	Introduction to Critical Thinking • Introduction and motivation • Definitions and origins • Mental and behavioral traits • Common cognitive biases • Reading, argument, and evidence • Real-world analysis Reading: - Critical Thinking Skills: Effective Analysis, Argument and Reflection , by: Stella Cottrell - @ 2024 , 4 th ed..



Week 2	Rules for Constructing Logical Arguments - General Rules for Good Arguments - Examples and Statistics - Arguing by Analogy - From Short Argument to Full Essay Reading: - Weston, A Rulebook for Arguments, Chapters 1–3.
Week 3	Logic and Fundamentals of Reasoning - Reasoning - Inference - Comparison of Reasoning and Inference - Types of Inference - Deductive and Inductive Logic - Structure of Logical Arguments - Common Logical Fallacies Reading: - Critical Thinking in the Age of Artificial Intelligence, Chapter 1&2
Week 4	Analyzing and Evaluating Arguments - Argument Analysis - Evaluation Criteria - Evaluating Information Sources - Applications in AI - Advanced Skills and Practical Tips - Real-World Case Studies Reading: - Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life
Week 5	Cognitive and Data Biases - Cognitive biases: confirmation bias, anchoring. - Data and algorithmic biases.
Week 6	Creative Thinking and Problem Solving - Accuracy vs. Precision/Recall. - Overfitting and Underfitting. Reading: Absolute Essentials of Creative Thinking and Problem Solving" Tony Proctor
Week 7	Midterm Exam and Review Lecture
Week 8	Statistical Thinking and Decision-Making - Statistical thinking Principles - Probability and Uncertainty Reading: Critical Thinking and Creative Analogies in Statistics, Science, and Technology Essential Skills for the AI Era
Week 9	Statistical Thinking and Decision-Making - Correlation and Casual - Data – Driven Decision Reading: Critical Thinking and Creative Analogies in Statistics, Science, and Technology Essential Skills for the AI Era
Week 10	Effective Communication The Logical Structure of Communication



	Reading: Paul, R & ,Elder, L. (2006). (Critical Thinking: Tools for Taking Charge of Your Learning and Your Life)
Week 11	Effective Communication Psychological Barriers to Effective Communication Reading: Paul, R & ,Elder, L. (2006). (Critical Thinking: Tools for Taking Charge of Your Learning and Your Life)
Week 12	Decisions Under Uncertainty - Expected Utility. - Value of Information. Reading: Decision Making Under Uncertainty: Theory and Application
Week 13	Model Interpretation (Explainable AI) - Basic principles of model interpretation. - Limits of interpretation. Reading: Interpretable Machine Learning** ↯ Christoph Molnar
Week 14	Ethics and Responsibility in AI - Issues of privacy, transparency, and fairness. - Principles of AI ethics. Reading: The Ethics of Artificial Intelligence
Week 15	Final Review + Project Presentations - General review of questions and concepts. - Open discussion.
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي العملي

	Material Covered
Week 1	Introduction to Critical Thinking - Practical Application - Cognitive Bias Identification Exercise: Students analyze real-world examples (news articles, advertisements) to identify cognitive biases such as confirmation bias, anchoring bias, and availability heuristic - Argument vs. Non-Argument Classification: Interactive exercises where students distinguish between arguments and mere assertions - Group Discussion: Analyzing case studies demonstrating the importance of critical thinking in everyday decision-making - Self-Assessment Tool: Students complete a critical thinking skills inventory to identify their baseline strengths and areas for development
Week 2	Constructing and Analyzing Arguments - Argument Mapping Workshop: Students practice creating visual argument maps (premise-conclusion diagrams) for complex arguments from various sources - Examples and Statistics Analysis: Evaluating the strength and relevance of examples



	and statistical evidence in written arguments - Analogy Construction Exercise: Students create and evaluate analogies, identifying strong vs. weak analogical reasoning - Peer Review Activity: Students exchange short argumentative paragraphs and provide constructive feedback on logical structure - Writing Exercise: Draft a short argument (250-300 words) on a given topic, applying rules from Weston's Rulebook
Week 3	Logic Fundamentals - Hands-on Practice - Deductive Reasoning Exercises: Solving syllogisms and identifying valid/invalid argument forms (Modus Ponens, Modus Tollens, etc.) - Inductive Reasoning Practice: Analyzing patterns and making probabilistic inferences from data sets - Logical Fallacy Hunt: Students examine opinion pieces, political speeches, or social media posts to identify and categorize common logical fallacies (ad hominem, straw man, false dilemma, slippery slope, etc.) - Truth Tables Construction: Practicing formal logic through truth table exercises for basic logical operators - Case Study Analysis: Evaluating the logical structure of arguments in AI-related ethical debates
Week 4	Evaluating Arguments and Sources - Source Credibility Assessment: Students evaluate multiple online sources on the same topic using CRAAP test (Currency, Relevance, Authority, Accuracy, Purpose) - Fact-Checking Exercise: Using fact-checking tools and techniques to verify claims from news articles and social media - AI-Generated Content Analysis: Identifying potential biases, inaccuracies, or limitations in AI-generated text - Comparative Analysis: Students compare treatment of the same topic across different media outlets to identify bias and perspective - Group Presentation Preparation: Begin working on critical analysis projects
Week 5	Cognitive and Data Biases Workshop - Cognitive Bias Simulation Games: Interactive activities demonstrating confirmation bias, anchoring effect, and availability heuristic - Dataset Bias Detection: Students analyze real datasets to identify sampling bias, selection bias, and measurement bias - Algorithmic Bias Case Studies: Examining documented cases of algorithmic bias (facial recognition, hiring algorithms, credit scoring) - Debiasing Strategies Practice: Applying techniques to minimize cognitive biases in decision-making



	- Reflection Journal: Students document their own experiences with cognitive biases during the week
Week 6	Creative Problem-Solving Workshop - Brainstorming Session: Using structured techniques (mind mapping, SCAMPER, six thinking hats) to generate creative solutions - Lateral Thinking Puzzles: Solving non-traditional problems requiring creative approaches - Overfitting/Underfitting Exercise: Analyzing machine learning model performance scenarios and determining appropriate model complexity - Precision vs. Recall Trade-offs: Practical exercises on balancing different performance metrics in AI systems - Innovation Challenge: Students apply creative thinking to propose solutions for real-world problems - Quiz 1 Review and Discussion
Week 7	Midterm Exam - Midterm Exam (Practical Component): - Argument analysis task - Logical fallacy identification - Source evaluation exercise - Short essay applying critical thinking principles - Post-Exam Discussion: Review of common challenges and key learning points from Weeks 1-6
Week 8	Statistical Thinking - Principles and Probability - Descriptive Statistics Exercise: Students analyze real datasets, calculating and interpreting measures of central tendency and variability - Probability Scenarios: Solving real-world probability problems (medical testing, risk assessment) - Bayesian Reasoning Practice: Applying Bayes' theorem to update beliefs based on new evidence - Uncertainty Quantification: Exercises on expressing and communicating uncertainty appropriately - Data Visualization Critique: Evaluating the effectiveness and potential misleading aspects of various data visualizations
Week 9	Correlation, Causation, and Data-Driven Decisions - Correlation Analysis: Using real datasets to calculate and interpret correlation coefficients - Causation vs. Correlation Exercises: Analyzing scenarios to distinguish between



	correlation and causation, identifying confounding variables - Experimental Design Workshop: Students design simple experiments to establish causal relationships - Data-Driven Decision Case Studies: Analyzing business/policy decisions based on data, identifying strengths and limitations - Simpson's Paradox Exploration: Interactive demonstration of how aggregated data can lead to misleading conclusions - Assignment 2 Review Session
Week 10	Effective Communication - Logical Structure - Argument Structuring Workshop: Students practice organizing complex ideas into clear, logical presentations - Thesis Statement Development: Crafting strong, defensible thesis statements for argumentative essays - Counterargument Integration: Exercises on acknowledging and refuting opposing viewpoints effectively - Logical Flow Analysis: Students evaluate and improve the coherence and logical progression of sample texts - Presentation Skills Practice: Short individual presentations on course-related topics with peer feedback on logical structure
Week 11	Overcoming Communication Barriers - Active Listening Exercise: Paired activities focusing on understanding before responding - Assumption Identification: Students analyze their own and others' unstated assumptions in arguments - Emotional Reasoning Recognition: Identifying when emotions override logic in decision-making and communication - Framing Effects Demonstration: Interactive exercises showing how message framing influences interpretation - Difficult Conversations Role-Play: Practicing critical thinking in emotionally charged discussions - Reflective Writing: Students analyze a personal communication challenge through a critical thinking lens
Week 12	Decision-Making Under Uncertainty - Expected Utility Calculations: Students solve decision problems using expected value and expected utility - Decision Trees Construction: Creating and analyzing decision trees for multi-stage decisions under uncertainty - Value of Information Analysis: Calculating how much it's worth to obtain additional



	information before deciding - Risk Assessment Exercise: Evaluating different risk scenarios (medical, financial, environmental) - Monte Carlo Simulation Introduction: Simple simulation exercises to understand uncertainty in outcomes - Group Decision-Making Activity: Collaborative exercise demonstrating challenges in group decisions under uncertainty
Week 13	Explainable AI and Model Interpretation - Black Box Model Exploration: Students interact with pre-trained machine learning models to understand their limitations in interpretability - Feature Importance Analysis: Using tools to identify which features most influence model predictions - LIME/SHAP Demonstrations: Hands-on practice with local interpretability methods - Ethical Implications Discussion: Case studies on consequences of using non-interpretable AI in high-stakes domains (healthcare, criminal justice) - Model Interpretation Presentation: Students present interpretations of a simple AI model's behavior - Project Report Guidelines and Workshop
Week 14	AI Ethics - Privacy, Transparency, and Fairness - Ethical Dilemma Analysis: Students analyze real-world AI ethics case studies (facial recognition, autonomous vehicles, algorithmic hiring) - Privacy Impact Assessment: Evaluating privacy implications of AI systems and data collection practices - Fairness Metrics Workshop: Understanding and calculating different definitions of algorithmic fairness - Transparency Audit: Students assess the transparency and explainability of AI systems in real applications - Ethical Framework Application: Applying different ethical frameworks (consequentialism, deontology, virtue ethics) to AI scenarios - Debate Session: Structured debate on controversial AI ethics topics
Week 15	• Present final projects + critical discussion. • Final assessment: Written report + presentation
Week 16	Final Exam



مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Stella Cottrell , "Critical Thinking Skills Effective analysis, argument and reflection", 4th edition , Bloomsbury Publishing Plc © Stella Cottrell 2023 2. Paul, R., & Elder, L. (2014). Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life (2nd ed.). Pearson. 3. Anthony Weston, "A Rulebook for Arguments", Copyright © 2017 by Hackett Publishing Company, Inc. (5th ed.). 4. Daniel Kahneman , "Thinking, Fast and Slow", Copyright © 2011 by Daniel Kahneman. 5. Cathy O'Neil, "Weapons of Math Destruction", Copyright © 2016 by Cathy O'Neil 6. Gareth James • Daniela Witten • Trevor Hastie Robert Tibshirani, "An Introduction to Statistical Learning", © Springer Science+Business Media New York 2013 (Corrected at th printing 2017) 7. Christoph Molnar , "Interpretable Machine Learning A Guide for Making Black Box Models Explainable", © 2022 Christoph Molnar, Germany, Munich.	No
Recommended Texts	1. Weston, A. (2018). A Rulebook for Arguments (5th ed.). Hackett Publishing. 2. Kahneman, D. (2011). Thinking, Fast and Slow. Farrar, Straus and Giroux. 3. O'Neil, C. (2016). Weapons of Math Destruction. Crown. 4. Molnar, C. (2022). Interpretable Machine Learning: A Guide for Making Black Box Models Explainable. Leanpub. 5. James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). An Introduction to Statistical Learning with Applications in R (2nd ed.). Springer.	
Websites	1. Critical Thinking Community – Foundation for Critical Thinking: https://www.criticalthinking.org 2. Stanford Encyclopedia of Philosophy: Critical Thinking: https://plato.stanford.edu/entries/critical-thinking/ 3. Interpretable Machine Learning Book – Christoph Molnar (online): https://christophm.github.io/interpretable-ml-book/ 4. Partnership on AI – Resources for Responsible AI: https://partnershiponai.org/	

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



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد

بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	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 CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	الديمقراطية وحقوق الانسان			Module Delivery	
Module Type	Basic			☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOB104				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UG1	Semester of Delivery		
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	Dr.Zahraa H. Alsultani		e-mail	zahraa@cois.uobaghdad.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		PH.D
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		10/10/2025	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	1- ان يتعرف الطالب على مفهوم الديمقراطية وفكرة نشوءها في الحضارات القديمة وفي الفكر المعاصر 2- ان يتعلم الطالب خصائص الديمقراطية وانواعها واركائها وعلاقة الديمقراطية بالفكر الاسلامي 3- معرفة مفهوم حقوق الانسان ومكانة حقوق الانسان في المجتمع الدولي واعلانات حقوق الانسان العالمية و ضماناتها في الدستور العراقي النافذ 4- تعرف الطالب على كفالة حقوق الانسان والحريات العامة في القوانين والدساتير والمواثيق الدولية 5- ان يتعرف الطالب على تطور مفهوم حقوق الانسان وحرياته واجيال حقوق الانسان وفق الإعلان العالمي لحقوق الانسان والعهد الدولي.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	مخرجات البرنامج المطلوبة وطرائق التعليم والتعلم والتقييم أ- الاهداف المعرفية 1- معرفة فكرة الديمقراطية وتاريخ نشوءها وعلاقتها بالاسلام 2- التعرف على حقوق الانسان مفهومها ومضامينها و ضماناتها 3- ان يتعرف الطالب على الحريات العامة انواعها و ضماناتها في القوانين 4- معرفة موقف الاسلام من حقوق الانسان وكفالاته الحريات العامة 5- ان يتعرف الطالب على النصوص الضامنة للحقوق والحريات في الدستور العراقي النافذ 6- ان يتعرف الطالب على الادلة القرآنية في مجال ضمان حقوق الانسان والحريات العامة . ب - الأهداف المهاراتية الخاصة بالبرنامج 1- ان يتعلم الطالب الدمج بين القوانين والمواثيق الدولية والليات الوطنية والاجرائية في مجال الديمقراطية والحقوق 2- ان يتعلم الطالب مهارة استنتاج الحقوق الواجب ضمانها في القوانين 3- ان يتعلم الطالب الربط بين الديمقراطية وكفالة حقوق الانسان باعتبار الديمقراطية توفر النظام السياسي الذي تكفل فيه هذه الحقوق .
Indicative Contents المحتويات الإرشادية	<u>تتضمن المحتويات الإرشادية ما يلي:</u> 1- مفهوم حقوق الانسان والشرعة الدولية لحقوق الانسان. [7 ساعات] 2- الليات الوطنية لحقوق الانسان والليات الاجرائية الرقابية والتوعوية لحقوق الانسان . [5 ساعات] 3- مواثيق الشرعة الدولية لحقوق الانسان والليات الوطنية والاجرائية لتطبيقها. [4 ساعات] 4- الحقوق الفنية والخاصة لحقوق الانسان. [7 ساعات] 5- الديمقراطية- الأصول التاريخية وتطور المسارات. [7 ساعات]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1- استخدام اساليب حديثة منها المحاضرات التفاعلية واستخدام أدوات بصرية كالعروض التقديمية والفيديوهات والتسجيلات.
	2- استنتاج مدى تطور مستوى تفكير الطلبة من خلال المناقشة معهم وفتح باب الحوار.
	3- طرح الاسئلة العامة على الطلبة وحثهم على التفكير والمشاركة
	4- الاستعانة بالكتب الخارجية والمصطلحات العامة لتوصيل الاهداف المبتغاة.
	5- ملاحظة مدى توسع افاق تفكير الطلبة من خلال المناقشة اللاحقة لطرح المصطلحات والمفاهيم.
	6- التعلم المدمج: دمج تقنيات التعلم الإلكتروني مع التعليم التقليدي باستخدام منصات التعلم عن بُعد، حيث يمكن للطلاب الوصول إلى مواد المحاضرات ومواد تعليمية إضافية، وتقديم الواجبات عبر الإنترنت.
	7- التقييم الذاتي والتغذية الراجعة: تشجيع الطلاب على تقييم أداء زملائهم من خلال التغذية الراجعة المستمرة لتعزيز مهارات النقد الذاتي والتحليل الشخصي.
	8- التعلم التعاوني: استخدام العمل الجماعي كاستراتيجية تعليمية من خلال مجموعات صغيرة لحل المشكلات اللغوية، مما يعزز التفاعل الاجتماعي ويُثمي مهارات التواصل.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	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	Quiz	1	10% (10)	9	LO #1- #6
	Assignments	4	10% (10)	3,5,8 &12	LO #1- #6
	participation in lecture	5	10% (10)	Continuous	All
	Project	1	10% (10)	9-15	LO #1- #6
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1- #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	معنى الحق، لغة- اصطلاحا- معنى الحق في القانون والمواثيق الدولية- حقوق الانسان والمواطنة
Week 2	انواع الحقوق الحقوق المدنية-الحقوق السياسية- الحقوق الاقتصادية والاجتماعية والثقافية
Week 3	خصائص حقوق الانسان-تطور حقوق الانسان عبر المراحل التاريخية- حقوق الانسان في مرحلة العصور القديمة
Week 4	حقوق الإنسان في العصور الوسطى. - حقوق الإنسان في العصر الحديث.
Week 5	Quiz
Week 6	الاليات الوطنية والاجرائية لحقوق الانسان



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد

بكالوريوس في التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Week 7	Midterm
Week 8	مفهوم الشريعة الدولية لحقوق الانسان. الإعلان العالمي لحقوق الانسان والقيمة القانونية له. العهد الدولي للحقوق المدنية والسياسية 1966 والعهد الدولي الخاص بالحقوق الاقتصادية والاجتماعية والثقافية 1966
Week 9	Quiz
Week 10	الحقوق الفئوية والخاصة. التمييز الإيجابي لصالح الفئات المستضعفة حقوق المرأة والطفل في المواثيق الدولية
Week 11	الحقوق الفئوية والخاصة. حقوق ذوي الإعاقة والأقليات والاتفاقية الدولية للقضاء على جميع اشكال التمييز العنصري
Week 12	الديمقراطية. المفاهيم التاريخية لنشأة الديمقراطية. أسس الديمقراطية الجذور التاريخية للديمقراطية
Week 13	تطور الديمقراطية في العصر الحديث
Week 14	المتلازمات المؤسسية للديمقراطية. الدستور المكتوب. الانتخابات الدورية. التداول السلمي للسلطة. الفصل بين السلطات. المتلازمات المجتمعية والسياسية للديمقراطية
Week 15	Project Presentation
Week 16	Final

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الكتاب الوزاري المنهجي لحقوق الانسان والديمقراطية، وزارة التعليم العالي والبحث العلمي، دائرة الدراسات والتخطيط والمتابعة	Yes
Recommended Texts	د.رياض عزيز هادي- حقوق الانسان (تطورها، مضامينها، حمايتها)، كلية العلوم السياسية، جامعة بغداد 2006 1. د. حسان محمد شفيق العاني، نظرية الحريات العامة، تحليل ووثائق، كلية العلوم السياسية، جامعة بغداد 2004 2. د.حميد حنون خالد، الانظمة السياسية، (دارالعاتك لصناعة الكتاب القاهرة، 2011)	Yes



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Websites	١. بحث في آليات الديمقراطية وحماية حقوق الإنسان في العراق بعد ٢٠٠٣ على الرابط https://www.iasj.net/iasj/article/173367
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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
ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن 0.5 إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة 54.5 إلى 55، بينما سيتم تقريب علامة 54.4 إلى 54). لدى الجامعة سياسة عدم التغاضي عن "العلامات التي تقترب من النجاح أو الرسوب"، لذا فإن التعديل الوحيد على العلامات التي منحها المصحح الأصلي سيكون التقريب التلقائي الموضح أعلاه.				



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module	Introduction to AI		Module Delivery	
Module Type	Core		☒Theory ☒Lecture ☒Lab ☒ Tutorial ☒ Practical ☒ Seminar	
Module Code				
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGI	Semester of Delivery		
Administering Department		AIAE	College	College of Artificial Intelligence
Module Leader	Assit.Prof.Dr. Ali Hussein Hamad		e-mail	ahmad@kecbu.uobaghdad.edu.iq
Module Leader’s Acad. Title		Assit.Prof	Module Leader’s Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		25/10/2025	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	• Introduce the fundamental concepts, history, and goals of Artificial Intelligence (AI). • Understand basic AI concepts. • Develop an understanding of AI technologies and their history. • Understand AI applications in various technologies and fields. • Understand future AI trends. • Describe and understand the definition and types of machine learning. • Introduce and understand key knowledge points of machine learning. • Introduce common machine learning algorithms to help better understand their functions and usages. • Master the implementation process of machine learning algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Define and explain the fundamental concepts, history, and components of Artificial Intelligence. • Use Python programming to implement machine learning algorithms and problem-solving techniques relevant to AI foundations. • Describe the principles of machine learning, NLP, and computer vision, and relate them to real-world applications. • Provide insights into the application fields and future of AI technologies based on their definition and scope. • Analyze ethical and societal challenges related to the design and deployment of AI systems. • Define and explain the fundamental concepts of machine learning. • Describe machine learning process and its key knowledge points. • Describe common machine learning algorithms to help better understand their functions and usages. • Demonstrate teamwork, communication, and reflective learning through lab-based and mini-project activities.
Indicative Contents	



المحتويات الإرشادية	• Introduction to AI: Definition, history, goals, applications, and intelligent agents. • Machine Learning: Basic concepts of data-driven learning; supervised and unsupervised learning. • Natural Language Processing: Understanding and generating human language. • Computer Vision: Basic image understanding and recognition. • Ethics and Responsible AI. • Python for AI: Data structures, functions, libraries, machine learning algorithms. • Practical Integration: Mini-project combining AI concepts with Python programming.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	• Lectures (2 hrs/week): Deliver theoretical concepts through interactive presentations and discussions. • Laboratory Sessions (2 hrs/week): Provide guided practical exercises using Python to apply theory to AI problems. • Case Studies and Ethical Debates: Encourage critical thinking through real-world examples. • Mini Projects and Group Work: Promote collaboration and creativity through small-scale AI models or prototypes. • Formative Assessment and Feedback: Include quizzes, reports, and peer feedback to enhance learning.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5:12
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3:08
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	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	11	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	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	The Concept of Artificial Intelligence
Week 2	The Technologies of AI
Week 3	The Applications of AI
Week 4	The Controversy of AI
Week 5	The Development Trends for AI
Week 6	Introduction to Machine Learning
Week 7	Types of Machine Learning
Week 8	Midterm
Week 9	The Overall Process of Machine Learning: Data Collection and Cleaning
Week 10	Data Conversion and Feature Selection
Week 11	Model Evaluation
Week 12	Common Algorithms of Machine Learning: Linear Regression and Logistic Regression
Week 13	Decision Tree and Support Vector Machine
Week 14	k-Nearest Neighbors Algorithm
Week 15	Naive Bayes and Clustering Algorithm
Week 16	Case Study



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: AI simulator Netlogo
Week 2	Lab 2: AI simulator Netlogo
Week 3	Lab 3: Introduction to Agent-Based Modeling (ABM) using NetLogo
Week 4	Lab 4: computer modeling and how you can use it.
Week 5	Lab 5: Wolf Sheep Predation, a predator-prey population model
Week 6	Lab 6: Traffic Basic
Week 7	Lab 7: Agents and Procedures

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Huawei Technologies Co., Ltd., (2023). <i>Artificial Intelligence Technology</i> . Springer. doi: 10.1007/978-981-19-2879-6	
Recommended Texts	Russell, S. J., & Norvig, P. (2021). <i>Artificial Intelligence: A Modern Approach</i> (4th ed.). Pearson.	
Websites	https://link.springer.com/book/10.1007/978-981-19-2879-6 https://e.huawei.com	



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد
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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



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 CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Organization & Architecture			Module Delivery	
Module Type	Core			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	AIEA1101				
ECTS Credits	4				
SWL (hr/sem)	200				
Module Level		1	Semester of Delivery		
Administering Department		Engineering Applications	College	Artificial Intelligence	
Module Leader	Ahmed Abdulhadi Jasim		e-mail	Ahmed.abdhadi@coeng.uobaghdad.edu.iq	
Module Leader’s Academic Title		D	Module Leader’s Qualification		Ph.D.
Module Tutor			e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		17/01/2026	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Topics include computer system performance, instruction set architectures, pipelining, branch prediction, memory-hierarchy design, and a brief introduction to multiprocessor architecture issues. General Introduction of Emulator 8086 and assembly language in the lab. 2. Assembly language programming, including logic, comparing and branching, interrupts, macros, procedures, arrays, program design, testing, debugging, loading, and linking; combinational, arithmetic and logical circuits ALU; memory circuits, latches, flip-flops, registers; computer structure; fetch-execute cycles, clocks and timing; microprogramming and microarchitecture; data path, timing, sequencing; cache memory organization; RISC architectures
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the key components within a computer system and organization. 2. Understand number systems and implement binary arithmetic with overflow handling and floating-point numbers. 3. understand digital logics, data path, and control using logic gates, combinational and sequential components 4. Analyze the cause of pipeline hazards and implement ways to overcome them. 5. Understand memory hierarchy and apply the principle of locality in cache design. 6. Understanding the need for the use of memory hierarchy (cache, main memory, storage devices) to ensure the design of a balanced computer system. 7. Understanding the fundamental principles of CPU and control unit design. 8. Discuss the relationship between the design of a computer system and the design of an operating system to operate it. 9. Evaluate various trade-offs in designing the instruction set architecture.
Indicative Contents المحتويات الإرشادية	1. GENERAL INTRODUCTION & REVIEW: - o Basic concepts revision - o computer Architectures - o computer design, - o History of computers - o computer Components 2. DATA REPRESENTATION - o Data Type Representation Signed number, fixed, floating point, character 3. GENERAL PURPOSE REGISTERS - o 8086 Emulator - o Combinational and sequential circuit - o Instruction set 4. MAIN MEMORY ORGANIZATION - o Type of computer memory - o Memory expansions - o Addressing modes and effective address



	- o Hierarchical memory organization - o Direct Memory Access 5. CENTRAL PROCESSING - o CPU Organization & Operation - o Hardware Implementation - o Performance of Computer - o Basic Measurement Metrics - o Pipelining: instruction 6. PARALLEL PROCESSORS - o Parallel Program - o SISD, MIMD, SIMD, SPMD, and Vector - o HW Multithreading - o Multicore and Shared Memory Multiprocessors
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies الإستراتيجيات	1. Understand Fundamentals: Start with the basics. Learn about binary arithmetic, logic gates, and basic digital circuit design. Understanding these fundamental concepts will provide a solid foundation 2. Follow a Structured Curriculum Look for structured courses or textbooks on computer architecture. These resources typically start with the basics and gradually introduce more complex topics. 3. Hands-On Practice: Theory is essential, but hands-on practice can deepen your understanding. Experiment with circuit simulators, assembly language programming, and hardware description languages. 4. Utilize Visual Aids: Computer architecture often involves abstract concepts that can be challenging to visualize. Look for diagrams, animations, or interactive simulations that illustrate key concepts like CPU pipelines, memory hierarchies, and instruction execution. Teaching Strategies: 1. Start with Basics: Begin by laying a solid foundation with fundamental concepts such as binary arithmetic, logic gates, and Boolean algebra. Use real-world examples to illustrate abstract concepts and make them more relatable. 2. Use Visual Aids: Computer architecture often involves intricate diagrams and structures. Utilize visual aids such as slides, animations, and interactive simulations to help students visualize abstract concepts like CPU pipelines, memory hierarchies, and instruction execution. 3. Encourage Active Learning: Instead of simply lecturing, engage students in active learning activities such as group discussions, problem-solving exercises, and hands-on projects. 4. Provide Real-World Examples: Relate computer architecture concepts to real-world applications and industry practices. Show how concepts like caching, pipelining, and parallel processing are used in modern processors and systems to improve performance and efficiency.



5. **Demonstrate with Simulations:** Use software tools and simulators to demonstrate how different architectural designs and optimizations impact system performance. Interactive simulations allow students to explore complex concepts in a controlled environment and see cause-and-effect relationships in action.
6. **Integrate Practical Exercises:** Design hands-on exercises and lab assignments that reinforce theoretical concepts and allow students to apply their knowledge in a practical setting.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	General Introduction & Review



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Week 2	Data Representation
Week 3	Combinational and sequential circuit
Week 4	Main Memory Organization
Week 5	Hierarchical memory organization
Week 6	Memory expansions and Instruction formats
Week 7	Central Processing Organization
Week 8	Midterm Exam
Week 9	Execute Of Complete Instruction
Week 10	Performance of Computer
Week 11	Pipelining processing
Week 12	Direct Memory Access
Week 13	Input-Output Organization
Week 14	RISC and CISC pipeline, SISD, MIMD, SIMD, SPMD, and Vector
Week 15	Huffman code instruction
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: General Introduction of Emulator 8086
Week 2	Lab 2: Numbering System
Week 3	Lab 3: assembly language (part1)
Week 4	Lab 4: assembly language (part2)
Week 5	Lab 5: assembly language (part3)
Week 6	Lab 6: 8086 interaction set1
Week 7	Lab 7: 8086 interaction set2
Week 8	Lab 8: Examples Methods
Week 9	Lab 9: Examples Methods
Week 10	Lab 10: Variables
Week 11	Lab 11: Inside the CPU
Week 12	Lab 12: Memory Access



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كل وحدة ائتمانية = ٢٥ ساعة



Week 13	Lab 13: XCHG Instruction
Week 14	Lab 14: Arithmetic Instruction
Week 15	Lab 15: Register Flag

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	- "Wang, Shuangbao Paul. Computer Architecture and Organization: Fundamentals and Architecture Security. Springer Nature, 2021. - Zomaya, Albert Y. "Advanced computer architecture and parallel processing." (2021)..	Yes
Recommended Texts	- Hayes, John P. <i>Computer architecture and organisation</i> . Tata McGraw Hill, 2022. - Nisan, Noam, and Shimon Schocken. <i>The elements of computing systems: building a modern computer from first principles</i> . MIT press, 2021. - Null, Linda. <i>Essentials of Computer Organization and Architecture</i> . Jones & Bartlett Learning, 2023.	No
Websites		



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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠,٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤,٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤,٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية

2025-2026

Second Semester



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Object Oriented Programming		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	AICI201				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1	Semester of Delivery		2	
Administering Department		AIEA	College	AIC	
Module Leader	Mohammed Al-Shammaa		e-mail	m.alshammaa@coeng.uobaghdad.edu.iq	
Module Leader's Academic Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
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	Programming Fundamentals	Semester	1
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental principles of object-oriented programming (OOP): encapsulation, inheritance, polymorphism, and abstraction. 2. Enable students to design and implement classes and objects to solve real-world computational problems. 3. Develop skills in applying OOP concepts using a modern programming language. 4. Build the ability to design reusable, maintainable, and extensible software systems. 5. Prepare students for advanced courses in software engineering, data structures, and applied AI systems that rely on OOP design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define and explain the four core principles of object-oriented programming: encapsulation, inheritance, polymorphism, and abstraction, with examples. 2. Compare and contrast procedural and object-oriented approaches to problem-solving, identifying when OOP is the appropriate paradigm. 3. Design classes and objects including attributes, methods, and access modifiers to model real-world entities and solve computational problems. 4. Implement encapsulation by using private/protected fields with appropriate getter/setter methods to protect data integrity. 5. Construct class hierarchies using inheritance to promote code reuse and represent "is-a" relationships. 6. Apply polymorphism (method overriding/overloading, interfaces, or abstract classes) to write flexible, extensible code. 7. Use abstraction to design simplified interfaces that hide implementation complexity from the end user. 8. Analyze a given problem statement and translate it into an appropriate object-oriented class design (e.g., via UML or class diagrams). 9. Evaluate the maintainability, reusability, and extensibility of a given OOP solution, identifying design improvements. 10. Develop small-to-medium software application that integrates all four OOP principles using a modern programming language (e.g. Python). 11. design decisions in OOP-based software, connecting them to broader software engineering practices (e.g., SOLID principles, design patterns) as preparation for advanced coursework.
Indicative Contents	Indicative Contents (Total SSWL = 124 hrs, over 15 weeks)



المحتويات الإرشادية	1. Introduction to OOP Paradigm: procedural vs. object-oriented programming, classes, objects, attributes, and methods. (1 week, 8 hrs) 2. Encapsulation: access modifiers, getters/setters, constructors/destructors/destructors/destructors/destructors, data validation. (1.5 weeks, 12 hrs) 3. Abstraction: abstract classes, interfaces, simplified APIs for complex systems. (1 week, 8 hrs) 4. Inheritance: single and multi-level inheritance, is-a vs. has-a relationships, method overriding, super/base class mechanisms. (2 weeks, 16 hrs) 5. Polymorphism: compile-time (overloading) and runtime (overriding) polymorphism, dynamic method dispatch, duck typing. (1.5 weeks, 12 hrs) 6. Class Relationships & UML: association, aggregation, composition, class/object diagrams, translating problem statements into designs. (1.5 weeks, 12 hrs) 7. Exception Handling in OOP Context: custom exception classes, try/catch/finally within object-oriented systems. (1 week, 8 hrs) 8. File/Data Persistence with Objects: object serialization/deserialization, basic file I/O with object structures. (1 week, 8 hrs) 9. Design Principles & Best Practices: OLID principles (intro-level), common design patterns (Singleton, Factory, Observer), code smells and refactoring basics. *(1.5 weeks, 12 hrs) 10. Testing & Debugging OOP Code: unit testing basics, debugging strategies for object interactions. (1 week, 8 hrs) 11. Case Studies / Applied Mini-Projects: real-world modeling exercises (e.g. library, banking, or inventory system) and a capstone-style integrative project. (2 weeks, 20 hrs) Total: 15 weeks, 124 hrs (contact/timetable hours) Exam hours (76 hrs) are recorded separately, total SSWL to 200 hrs.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

الاستراتيجيات

This module employs a blended learning strategy combining lecture-based instruction with visual aids and UML models to deliver core OOP theory, hands-on programming labs for direct application of classes, objects, and design patterns, and problem-based learning through real-world scenarios such as library or banking systems. Students further engage in case study analysis and collaborative mini projects to evaluate reusable and maintainable software designs, culminating in a final integrative project that requires them to combine all four OOP pillars: encapsulation, inheritance, polymorphism, and abstraction into a single working application.

يعتمد هذا المقرر على استراتيجية تعلم متكاملة تجمع بين المحاضرات النظرية المدعومة بالوسائل البصرية ومخططات UML لتوصيل المفاهيم الأساسية للبرمجة كائنية التوجه، والمختبرات العملية التي تتيح للطلبة تطبيق مفاهيم الأصناف (Classes) والكائنات (Objects) وأنماط التصميم بشكل مباشر، إضافة إلى التعلم القائم على حل المشكلات من خلال أمثلة واقعية مثل أنظمة المكتبات أو الأنظمة المصرفية. كما يشارك الطلبة في تحليل دراسات حالة ومشاريع جماعية صغيرة لتقييم قابلية إعادة الاستخدام والصيانة في تصاميم البرمجيات، لينتهي المقرر بمشروع تكاملي نهائي يتطلب من الطلبة دمج الركائز الأربع للبرمجة كائنية التوجه التغليف (Encapsulation)، والوراثة (Inheritance)، وتعدد الأشكال (Polymorphism)، والتجريد (Abstraction) ضمن تطبيق برمجي واحد متكامل.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	124	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	8.3
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	76	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد
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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Formative assessment	Quizzes	2	10% (10)	5 and 10	Quiz 1: LO #1, #2, #3, #4, Quiz 2: LO #5, #6, #7
	Assignments	2	10% (10)	2 and 12	Assignment 1: LO #1, #2, #3, Assignment 2: LO #8, #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to OOP Paradigm vs. Object-Oriented Programming, Classes, Objects, Attributes, and Methods
Week 2	Encapsulation: Access Modifiers (private, protected, public), Constructors and Destructors
Week 3	Encapsulation (cont'd) Getters/Setters, Data Validation within Classes
Week 4	Abstraction: Abstract Classes vs. Concrete Classes, Interfaces and Contracts
Week 5	Inheritance: Single and Multi-level Inheritance
Week 6	Inheritance (cont'd) Method Overriding, Super/Base Class Mechanisms
Week 7	Mid-term Exam + Polymorphism: Compile-time Polymorphism
Week 8	Polymorphism (cont'd) Runtime Polymorphism (Overriding), Dynamic Method Dispatch
Week 9	Class Relationships & UML: Association, Aggregation, Composition
Week 10	Class Relationships & UML (cont'd) Class/Object Diagrams, Translating Problem Statements into Designs
Week 11	Exception Handling in OOP Context: Custom Exception Classes, Try/Catch/Finally
Week 12	File/Data Persistence with Objects: Object Serialization/Deserialization, Basic File I/O
Week 13	Design Principles & Best Practices: SOLID Principles (Intro), Design Patterns (Singleton, Factory, Observer)
Week 14	Testing & Debugging OOP Code: Unit Testing Basics, Debugging Object Interactions
Week 15	Case Studies & Applied Mini-Projects: Real-World Modeling, Integrative Capstone-Style Project
Week 16	Preparatory Week before the Final Exam



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد
بكالوريوس في الذكاء الاصطناعي / التطبيقات الهندسية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to the Programming Environment and IDE Setup
Week 2	Lab 2: Defining Classes and Objects with Attributes and Methods
Week 3	Lab 3: Encapsulation (Access Modifiers, Getters/Setters, Constructors)
Week 4	Lab 4: Abstraction (Abstract Classes and Interfaces)
Week 5	Lab 5: Inheritance (Building Class Hierarchies)
Week 6	Lab 6: Polymorphism (Method Overloading and Overriding)
Week 7	Lab 7: UML Class Diagrams and Class Relationships
Week 8	Lab 8: Exception Handling (Custom Exceptions and Try/Catch)
Week 9	Lab 9: File Handling and Object Serialization
Week 10	Lab 10: Integrative Mini-Project (Applying All Four OOP Pillars) Part 1
Week 11	Lab 11: Integrative Mini-Project (Applying All Four OOP Pillars) Part 2

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Python Crash Course, Eric Matthes, No Starch Press	Yes
Recommended Texts	1.Object-Oriented Programming in Python, Dusty Phillips (Python 3 Object-Oriented Programming), Packt Publishing 2.Head First Design Patterns, Eric Freeman and Elisabeth Robson, O'Reilly Media	No
Websites	https://www.coursera.org/specializations/python-3-programming	



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

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠,٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤,٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤,٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Probability and Statistics		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☒Seminar		
Module Code	AIC1203				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		1	Semester of Delivery		1
Administering Department		AIEA	College	AIC	
Module Leader	Dr. Basad Al-Sarray		e-mail	basad.husain@sc.uobaghdad.edu.iq	
Module Leader’s Academic Title		Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	-		e-mail	-	
Peer Reviewer Name		-	e-mail	-	
Scientific Committee Approval Date		01/06/2026	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Calculus-I	Semester	1
Co-requisites module		Semester	

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives	To introduce fundamental concepts of probability theory and statistical analysis. To develop understanding of data distributions and uncertainty modeling.



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أهداف المادة الدراسية	To equip students with tools for descriptive and inferential statistics. To enable interpretation of real-world data using statistical methods. To build analytical thinking for decision-making under uncertainty. To prepare students for applications in data science, AI, and research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Define basic probability concepts and axioms. Differentiate between discrete and continuous random variables. Compute probabilities using common distributions (Binomial, Normal, Poisson). Apply descriptive statistics (mean, variance, standard deviation). Perform hypothesis testing and confidence interval estimation. Analyze relationships using correlation and regression. Interpret statistical results in real-world contexts. Use tools like Excel, R, or Python for statistical analysis. Construct probability models for real datasets. Conduct small statistical projects and present findings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Foundations of Probability Basic Concepts – Sample space, events, probability axioms. [SSWL=10 hrs] Counting Techniques – Permutations, combinations, counting rules. [SSWL=8 hrs] Conditional Probability & Bayes Theorem. [SSWL=10 hrs] Part B – Random Variables and Distributions Discrete Random Variables – PMF, expectation, variance. [SSWL=10 hrs] Continuous Random Variables – PDF, CDF, properties. [SSWL=10 hrs] Common Distributions – Binomial, Poisson, Normal. [SSWL=12 hrs] Part C – Descriptive and Inferential Statistics Descriptive Statistics – Mean, median, mode, variance, skewness. [SSWL=8 hrs] Sampling Methods and Data Collection. [SSWL=8 hrs] Confidence Intervals and Hypothesis Testing. [SSWL=12 hrs] Part D – Statistical Modeling and Applications Correlation and Regression Analysis. [SSWL=10 hrs] ANOVA and Statistical Decision Making. [SSWL=8 hrs] Statistical Tools – Excel, R, Python (NumPy, Pandas, SciPy). [SSWL=12 hrs] Project Work and Review Sessions. [SSWL=12 hrs]



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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	Students are expected to use their knowledge in probability to solve problems. This course strengthens students' understanding of probability in simulation and random number generation. Statistics concepts are important in data collection and analysis process. Emphasis is placed on the exploration of real-world statistics applications. Students are expected to learn to choose and use appropriate statistics to analyze empirical situations, to understand them better, and to improve decisions		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (hr/sem)	33	Structured SWL (hr/w)	2.2
الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (hr/sem)	17	Unstructured SWL (hr/w)	1.1
الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (hr/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% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المناهج الأسبوعية النظرية	
	Material Covered
Week 1	Introduction and basic concepts of statistics and definitions. Types of data sets, types of sampling and collecting data.



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Week 2	Construction of frequency distributions (grouped data and ungrouped data) Relative frequency distributions and cumulative frequency distributions (less than & more than)
Week 3	Frequency Distribution Charts : Histogram, Polygon, curve and Pie charts.
Week 4	Measures of Central Tendency , Measures of Variation
Week 5	Introduction to probability and counting rules
Week 6	Combinations and Permutation
Week 7	Mid-term Exam
Week 8	Probability of discrete random variable
Week 9	Probability of continuous discrete random
Week 10	Moments computing of density and mas function
Week 11	Discrete probability distribution: (Uniform -Binomial)
Week 12	Continuous probability distribution(Uniform , Normal)
Week 13	Simulation experiments and data generation
Week 14	Seminar and discussion of groups projects
Week 15	Preparation of final exam
Week 16	Final exam

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Elementary Statistics: A Step By Step Approach ISE. 11th Edition 1265248125 · 9781265248123 By Allan G. Bluman © 2023 Published: September 22, 2022 Ross, Sheldon M. Introduction to probability and statistics for engineers and scientists. Academic press, 2020.	
Recommended Texts	<i>Rohatgi, Vijay K., and AK Md Ehsanes Saleh. An introduction to probability and statistics. John Wiley & Sons, 2015.</i>	yes
Websites	https://www.mheducation.co.uk/elementary-statistics-a-step-by-step-approach-ise-9781265248123-emea-group	

Grading Scheme مخطط الدرجات				
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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	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded



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(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

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ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠,٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤,٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤,٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Principles of Electrical Circuits			Module Delivery	
Module Type	Core			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	AIEA1202				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1	Semester of Delivery			
Administering Department		AIEA	College	AIC	
Module Leader	AHMED ABDULKADHIM M.HASAN		e-mail	AHMED@coeng.uobaghdad.edu.iq	
Module Leader’s Acad. Title		Assist. Lect.	Module Leader’s Qualification		MS.c
Module Tutor	Name (if available)		e-mail	E-mail	
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 Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits , AC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis.

Learning and Teaching Strategies



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استراتيجيات التعلم والتعليم

Strategies	Preparation and participation will be important for learning notes (you will be responsible for studying the notes prior each lecture). Several active learning techniques. Homework problems will be assigned
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SSWL (h/sem)	4.3
Unstructured USSWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	EXAM (h/sem)	2.4
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Lab.	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري



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	Material Covered
Week 1	Introduction - Difference between Circuit Theory and Field Theory
Week 2	Units and Notations & Resistance, Ohm's Law
Week 3	D.C. Series Circuits, D.C. Parallel Circuits
Week 4	Kirchhoff's Voltage Law, voltage divider rule, Kirchhoff's Current Law, current divider rule
Week 5	Current Sources, Sources Conversion
Week 6	Mesh and Nodal Analysis
Week 7	Δ -Y and Y- Δ conversions
Week 8	Mid exam
Week 9	Superposition Theorem
Week 10	Thevenin's Theorem , Norton's Theorem , Maximum Power Transfer Theorem
Week 11	Sinusoidal and Alternating Waves
Week 12	Response of basic resistor, inductor and capacitor elements to sin voltage
Week 13	Complex Numbers
Week 14	Series and Parallel A.C. Circuits
Week 15	Phase Drawing
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to LAB Instruments & tools
Week 2	Lab 2: ohm's law
Week 3	Lab 3: Kirchhoff's Laws
Week 4	Lab 4: delta -star conversion
Week 5	Lab 5: superposition theory
Week 6	Lab 6: Norton theory
Week 7	Lab 7: Thevenin's theory
Week 8	Lab 8: quiz
Week 9	Lab 9: ac signals oscilloscope
Week 10	Lab 10: passive element connection (series and parallel)



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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introductory Circuit Analysis by Robert L. Boylestad 5th edition	Yes
Recommended Texts	Electrical Circuits Fundamentals by Thomas L. Floyd 8th edition Prentice Hall 2010	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Engineering Mechanics / Statics		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	AIEA1201				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UG1			Semester of Delivery
Administering Department		AIEA	College	AIC	
Module Leader	Waleed Khalid Khairi Al-Ashtari		e-mail	Waleed.Al.Ashtari@coeng.uobaghdad.edu.iq	
Module Leader’s Academic Title		Professor	Module Leader’s Qualification		PhD
Module Tutor	Name (if available)		e-mail	E-mail	
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 Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a solid foundation in the principles of Engineering Mechanics (Statics) required for the analysis of engineering systems. 2. To develop the ability to model engineering problems by constructing appropriate free-body diagrams and applying the principles of static equilibrium. 3. To enable students to analyze force systems, moments, friction, trusses, frames, centroids, and moments of inertia using analytical methods. 4. To develop students' engineering problem-solving skills through systematic analysis, critical thinking, and mathematical reasoning. 5. To prepare students for advanced engineering courses such as Dynamics, Strength of Materials, Machine Design, and Structural Analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the semester, the student will be able to: 1. Apply the fundamental principles of Engineering Mechanics to analyze forces, moments, and equilibrium conditions in engineering systems. 2. Construct accurate free-body diagrams and formulate equilibrium equations for particles and rigid bodies. 3. Analyze trusses, frames, machines, and friction problems using appropriate engineering methods. 4. Determine centroids, centers of gravity, and area moments of inertia for simple and composite bodies. 5. Solve engineering mechanics problems using appropriate analytical methods while demonstrating logical reasoning and mathematical accuracy. 6. Communicate engineering solutions clearly using proper technical terminology, diagrams, and calculations. 7. Interpret engineering problems and critically evaluate the validity of the obtained results.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction to Engineering Mechanics, vectors, force systems, and free-body diagrams [8 hrs] • Equilibrium of particles and rigid bodies in two and three dimensions [8 hrs] • Trusses, frames, and machines [8 hrs] • Friction and engineering applications [5 hrs] • Centroids, centers of gravity, and moments of inertia [7 hrs] • Virtual work and introductory applications [4 hrs] • Revision and problem-solving classes [5 hrs] Total hrs = 45 = SSWL – (Exam hrs) = 48 – 3 = 45 hr (Time table hrs × 15 weeks).



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Students are taught through an analytical and problem-solving approach that emphasizes conceptual understanding and engineering applications. Interactive Lectures: Presenting theoretical concepts using presentations, engineering illustrations, and worked examples. Problem-Based Learning (PBL): Students solve progressively challenging engineering mechanics problems to develop analytical thinking and mathematical modeling skills. Active Learning: Students participate in classroom discussions, construct free-body diagrams, and solve problems individually and collaboratively. Blended Learning: Providing lecture materials, solved examples, assignments, and supplementary resources through the university's learning management system. Continuous Assessment and Feedback: Regular quizzes, assignments, and classroom activities are used to monitor progress and provide constructive feedback. Collaborative Learning: Students work in small groups to analyze engineering problems, evaluate alternative solution methods, and improve communication skills. Self-Directed Learning: Students are encouraged to study textbook examples, solve additional exercises, and review engineering applications independently.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Quiz	2	10% (10)	5&9	LO #1, #2 and #3



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Formative assessment	Assignments	4	5% (5)	3,5,8 &12	LO #1, #2
	participation in lecture	5	5% (4)	Continuous	All
	Portfolio	1	10% (10)	13	LO #2 & #3
	Project	1	10% (10)	9-15	LO #3 & #4
Summative assessment	Midterm Exam	2hr	10% (10)	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	Introduction to Engineering Mechanics, fundamental concepts, units, vectors and scalars, Newton's laws, and free-body diagrams.
Week 2	Force vectors, vector operations, Cartesian vectors, and applications.
Week 3	Equilibrium of a particle in two and three dimensions.
Week 4	Force system resultants, moment of a force, couple moments, and equivalent force systems.
Week 5	Quiz. Equilibrium of rigid bodies in two dimensions and support reactions.
Week 6	Structural analysis: Trusses, method of joints, and method of sections.
Week 7	Midterm Examination.
Week 8	Frames and machines, analysis of internal and external forces.
Week 9	Quiz. Friction: Dry friction, wedges, screws, and practical applications.
Week 10	Centroids and centers of gravity of lines, areas, and composite bodies.
Week 11	Area moments of inertia and the parallel-axis theorem.



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Week 12	Virtual work and potential energy methods for equilibrium.
Week 13	Distributed loads, internal force analysis, and an introduction to shear force and bending moment diagrams.
Week 14	Comprehensive problem-solving and review of major topics.
Week 15	Revision and preparation for the final examination.
Week 16	Final Examination.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	F. P. Beer, E. R. Johnston Jr., D. F. Mazurek, P. J. Cornwell, and B. S. Self, <i>Vector Mechanics for Engineers: Statics</i>, 13th Edition, McGraw-Hill Education, 2021.	Yes
Recommended Texts	1. J. L. Meriam, L. G. Kraige, and J. N. Bolton, <i>Engineering Mechanics: Statics</i>, 9th Edition, Wiley, 2023. 2. R. C. Hibbeler, <i>Engineering Mechanics: Statics</i>, 15th Edition, Pearson, 2022.	Yes
Websites	• https://ocw.mit.edu • https://nptel.ac.in • https://engineeringlibrary.org • https://www.engineeringtoolbox.com	



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Calculus II			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CAI1202				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1	Semester of Delivery			
Administering Department		AIEA	College	AIC	
Module Leader	Ziyad Allawi		e-mail	Ziyad.allawi@coeng.uobaghdad.edu.iq	
Module Leader's Acad. Title		Asst. Prof	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		1/10/2025	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module transitions students from differential to integral calculus. The objective is to introduce the concept of accumulation through Riemann sums and formalize it via the definite integral. The course aims to establish the deep connection between differentiation and integration (The Fundamental Theorem of Calculus) and train



	students to apply integration to complex geometric, physical, and analytical problems, alongside mastering advanced techniques of integration.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this module, students will be able to: Formulate Riemann sums to approximate areas and understand the limit definition of the definite integral. Apply the Fundamental Theorem of Calculus to evaluate definite integrals and understand net change. Use integration to solve geometric problems, including the area between curves, volumes of solids of revolution, arc length, and surface area. Understand the rigorous calculus-based definitions of the natural logarithm and exponential functions. Evaluate complex indefinite and definite integrals using advanced techniques (substitution, partial fraction decomposition). Determine the convergence or divergence of improper integrals.
Indicative Contents المحتويات الإرشادية	The Definite Integral: Riemann sums, area approximations, average value of a function. Fundamental Theorem of Calculus: Connecting antiderivatives to definite integrals, integrating rates of change. Applications of Integrals: Area between curves, volumes (slicing, disk, and washer methods), arc length of a curve, areas of surfaces of revolution. Transcendental Functions: The natural logarithm defined as an integral, the exponential function as an inverse, relative rates of growth (Big-O notation). Techniques of Integration: Advanced algebraic substitutions, completing the square, partial fraction decomposition (Heaviside method). Advanced Tools: Using Integral Tables and Computer Algebra Systems (CAS), evaluating improper integrals (infinite limits or infinite discontinuities), and comparison tests.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lectures: Step-by-step derivations of integral applications (e.g., deriving the arc length formula) and technique demonstrations. Visual/Spatial Learning: Utilizing 3D modeling software or physical manipulatives to help students visualize cross-sections and solids of revolution, which is often a major hurdle in Calculus II. Problem-Based Tutorials: Supervised practice focusing heavily on algebraic manipulation and pattern recognition required for advanced integration techniques. Formative Assessments: Short, regular quizzes to ensure students are memorizing key integration formulas and maintaining algebraic fluency.
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Student Workload (SWL)



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الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
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	5	10%	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10%	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10%	Continuous	All
	Report	1	10%	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Approximating Areas, Sigma Notation, Riemann Sums
Week 2	The Definite Integral
Week 3	The Fundamental Theorem of Calculus, Indefinite Integrals, Substitution Method
Week 4	Definite Integral Substitution, Area Between Curves
Week 5	Volumes Using Cross-Sections, Volumes Using Cylindrical Shells
Week 6	Arc Length, Areas of Surfaces of Revolution
Week 7	Work and Fluid Forces, Moments, Centers of Mass
Week 8	Mid-Term Examination
Week 9	The Logarithm Defined as an Integral



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Week 10	Hyperbolic Functions
Week 11	Basic Integration Formulas, Integrating by Parts
Week 12	Trigonometric Substitutions, Integration by Partial Fractions
Week 13	Improper Integrals
Week 14	Parameterization of Plane Curves, Calculus with Parametric Curves
Week 15	Polar Coordinates, Graphing Polar Coordinate Equations, Areas and Lengths
Week 16	Final-Term Examination

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus Early Transcendentals (11th Edition) (Thomas Series), Addison-Wesley Longman Publishing Co., Boston, MA, United States, ISBN 978-0-321-19800-6	Y
Recommended Texts		Y
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 CATALOGUE

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	AIC1204				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		1			Semester of Delivery
Administering Department		AIEA	College	AIC	
Module Leader	Assoc. Prof. Dr. Wisam Al-Wajidi		e-mail	wisam.h@uobaghdad.edu.iq	
Module Leader's Academic Title		Assoc. Prof. Dr.	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name			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 Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamentals of engineering drawing standards and conventions. 2. Develop skills in creating and interpreting technical drawings. 3. Apply orthographic, isometric, and sectional drawing techniques. 4. Visualize and represent three-dimensional engineering components accurately. 5. Use engineering drawings for effective communication in design and manufacturing. 6. Apply the state-of-the-art computer drafting for the Engineering Applications
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: 1. Explain the fundamental principles, standards, and conventions of engineering drawing. 2. Use drawing instruments and CAD software to prepare accurate engineering drawings. 3. Construct and interpret lettering, scales, dimensioning, and geometric constructions. 4. Draw orthographic projections of points, lines, and planes according to engineering standards. 5. Develop orthographic projections of simple and complex solids in different positions. 6. Create sectional views and identify appropriate sectioning techniques for engineering components. 7. Prepare auxiliary views to represent inclined and oblique surfaces accurately. 8. Draw isometric views and convert between orthographic and isometric projections. 9. Generate development of surfaces for common engineering solids and sheet metal components. 10. Interpret and prepare assembly and detailed working drawings of mechanical components. 11. Apply tolerances, limits, fits, and surface finish symbols in engineering drawings. 12. Read and interpret industrial engineering drawings in accordance with international standards. 13. Demonstrate spatial visualization skills for solving engineering graphical problems. 14. Apply engineering drawing principles to communicate design concepts effectively in engineering practice. 15. Produce complete, accurate, and professional engineering drawings that meet accepted engineering standards.
Indicative Contents	Indicative content includes the following.



المحتويات الإرشادية	Introduction to Engineering Drawing: Engineering graphics, standards (ISO/ASME), drawing instruments, sheet layout, line types, lettering, scales. [4 hrs] Geometric Constructions and Dimensioning: Geometric constructions, engineering symbols, dimensioning methods, tolerances, fits. [6 hrs] Orthographic Projection: Principles of projection, first-angle and third-angle projection, projection of points, lines, planes, and simple solids. [10 hrs] Sectional Views and Auxiliary Views: Full, half, offset, broken-out sections; auxiliary projections. [6 hrs] Isometric and Pictorial Drawing: Isometric projection, isometric drawing, conversion between orthographic and isometric views. [6 hrs] Development of Surfaces: Development of prisms, pyramids, cylinders, cones, transition pieces, and sheet-metal applications. [5 hrs] Introduction to CAD (SolidWorks): Interface, file management, templates, sketch environment, coordinate systems. [4 hrs] 2D Sketching in SolidWorks: Sketch tools, geometric constraints, dimensions, editing, design intent. [8 hrs] 3D Part Modeling: Extrude, Revolve, Sweep, Loft, Hole Wizard, Fillet, Chamfer, Shell, Draft, Patterns, Mirror. [10 hrs] Assembly Modeling: Mates, assembly constraints, exploded views, interference detection, motion basics. [6 hrs] Engineering Drawings from SolidWorks Models: Standard views, section views, detail views, dimensions, annotations, tolerances, Bill of Materials (BOM). [6 hrs] Course Project and Practical Applications: Complete design project integrating manual drawing, 3D modeling, assembly, and manufacturing drawings. [4 hrs]
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استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	- Interactive lectures - Demonstration of engineering drawing techniques - Hands-on laboratory sessions (SolidWorks) - Guided drawing and CAD exercises - Problem-solving and design assignments - Individual and group projects - Case studies and real engineering examples - Self-directed learning and practice - Continuous feedback and formative assessment These strategies effectively support both manual engineering drawing skills and CAD proficiency.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (hr/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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Engineering Drawing, drawing standards (ISO), drawing instruments, sheet layout, line types, and lettering
Week 2	Scales, geometric constructions, and dimensioning principles
Week 3	Orthographic projection: Principles, projection of points and lines
Week 4	Projection of planes and true shapes
Week 5	Projection of solids (prisms, pyramids, cylinders, cones)
Week 6	Advanced projection of solids in different positions
Week 7	Sectional views: Full, half, offset, and broken sections
Week 8	Auxiliary views and visualization techniques
Week 9	Isometric projection: Principles and methods
Week 10	Isometric drawing from orthographic views
Week 11	Orthographic drawing from isometric views
Week 12	Development of surfaces of common solids
Week 13	Working drawings, dimensioning, and engineering symbols
Week 14	Assembly and detail drawings of simple mechanical components
Week 15	Course review and comprehensive drawing exercise
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to SolidWorks: User interface, file management, templates, units, and navigation
Week 2	Basic 2D sketching: Lines, circles, arcs, rectangles, polygons, trim, offset, and sketch constraints
Week 3	Advanced sketching: Smart dimensions, geometric relations, sketch editing, and fully defined sketches
Week 4	Basic 3D modeling: Extruded Boss/Base, Extruded Cut, Revolved Boss/Base, and Revolved Cut
Week 5	Feature-based modeling: Fillet, Chamfer, Hole Wizard, Shell, Draft, and Rib features
Week 6	Pattern and Mirror features: Linear, Circular, Sketch-driven Patterns, and Mirror



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Week 7	Advanced modeling: Sweep, Loft, Reference Geometry (Planes, Axes), and Helix/Spiral
Week 8	Midterm practical exercise: Modeling of individual mechanical parts
Week 9	Assembly modeling: Inserting components, standard mates, and assembly constraints
Week 10	Advanced assemblies: Exploded views, interference detection, and assembly management
Week 11	Engineering drawings: Standard views, projected views, dimensions, annotations, and centerlines
Week 12	Advanced drawings: Section views, detail views, auxiliary views, broken views, and Bill of Materials (BOM)
Week 13	Sheet metal and weldment basics (or practical part modeling exercises, depending on program requirements)
Week 14	Integrated CAD project: Part modeling, assembly creation, and production drawing preparation
Week 15	Final practical project presentation and laboratory assessment

Learning and Teaching Resources		
مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	- David Madsen, Engineering Drawing and Design, 5th Edition, Cengage Learning, 2011 - Engineering Drawing by N. D. Bhatt. - Practical Geometry & Engineering Graphics by Abbot. - Shirley, P., Ashikhmin, M., & Marschner, S. (2009). <i>Fundamentals of computer graphics</i>. AK Peters/CRC Press.	Yes
Recommended Texts	- Dennis K. Lieu, Sheryl A. Sorby, Visualization, Modeling, and Graphics for Engineering Design, 2nd Edition, Cengage Learning, 2016 - Technical Graphics Communication by Bertoline Wiebe, Miller. Mohler, Irwin McGraw-Hill. - Machine Drawing By. Dr. K. L. Narayana.	No
Websites		



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Grading Scheme

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	F – Fail	راسب	(0-44)	Considerable amount of work required

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

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠,٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤,٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤,٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.