2025-2026

First semester

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		AIBM	**College**		AIC
Module Leader	Anfal Mudhafar Ali		**e-mail**		anfal.m@csw.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 = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies الإستراتيجيات	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.

	4. 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. 5. Collaborative Learning: Using teamwork as an educational strategy through small groups to solve linguistics problems, fostering social interaction and developing communication skills 6. 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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (hr/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (hr/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب 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 *to Be*, 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 Rymond Murphy.	Yes
Websites	https://elt.oup.com/student/headway/beg/ https://test-english.com/	

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	**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**	1
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 واركانها وعلاقة الديمقراطية بالفكر الاسلامي 3- معرفة مفهوم حقوق الانسان ومكانة حقوق الانسان في المجتمع الدولي واعلانات حقوق الانسان العالمية وضماناتها 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 والعهدين الدوليين.
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 ومضامنها وضماناتها 3- ان يتعرف الطالب على الحريات العامة انواعها وضماناتها في القوانين 4- معرفة موقف الاسلام من حقوق الانسان وكفالته 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 والاليات الوطنية والاجرائية في مجال الديقراطية والحقوق 2- ان يتعلم الطالب مهارة استنتاج الحقوق الواجب ضمانها في القوانين 3- ان يتعلم الطالب الربط بين الديمقراطية وكفالة حقوق الانسان بأعتبار الديمقراطية توفر النظام السياسي الذي تكفل فيه هذه الحقوق .
Indicative Contents المحتويات الإرشادية	تتضمن المحتويات الإرشادية ما يلي: 1- مفهوم حقوق الانسان والشرعة الدولية لحقوق الانسان. [7 ساعات] 2- الاليات الوطنية لحقوق الانسان والاليات الإجرائية الرقابية والتوعوية لحقوق الانسان . [5 ساعات] 3- مواثيق الشرعة الدولية لحقوق الانسان والآليات الوطنية والاجرائية لتطبيقها. [4 ساعات] 4- الحقوق الفئوية 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- التعلّم المدمج: دمج تقنيات التعلّم الإلكتروني مع التعليم التقليدي باستخدام منصات التعلّم 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- التعلّم التعاوني: استخدام العمل الجماعي كاستراتيجية تعليمية من خلال مجموعات صغيرة لحل المشكلات اللغوية، مما يُعزز التفاعل الاجتماعي ويُنمّي مهارات التواصل.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	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)

المنهاج 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

Week 7	**Midterm**
Week 8	مفهوم الشرعة 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 حقوق 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،(دار العاتك لصناعة الكتاب القاهرة،2011)	Yes

Websites	1.**بحث في آليات الديمقراطية وحماية حقوق الانسان في العراق بعد 2003** على الرابط https://www.iasj.net/iasj/article/173367

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**	
Module Code				☒**Lecture**	
ECTS Credits	**5**			☒**Lab**	
SWL (hr/sem)	125			☒ **Tutorial**	
				☒ **Practical**	
				☒ **Seminar**	
Module Level		UGI	**Semester of Delivery**		1
Administering Department		DBA	**College**	College of Artificial Intelligence	
Module Leader	Marwan Kadhim Mohammed		**e-mail**	Marwan.kazem@cc.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		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.

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5:12
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3:08
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	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). *Artificial Intelligence Technology.* Springer. doi: 10.1007/978-981-19-2879-6	
Recommended Texts	Russell, S. J., & Norvig, P. (2021). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.	
Websites	https://link.springer.com/book/10.1007/978-981-19-2879-6 https://e.huawei.com	

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.

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

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**	1	
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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	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 , 4th 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** لـ 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**

Learning and Teaching Resources

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

	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.

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

MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Principle of Biology**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AIBM1101**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UG1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr.Rasha Al-khalidi		**e-mail**	rasha.ali@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Assistant Prof		**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	16/11/2025		**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	▯ The module aims to provide students with a solid foundation in the fundamental principles of biology, covering the structure and function of cells, biomolecules, genetics, evolution, physiology, and introductory biotechnology. This prepares students for advanced study in biomedical sciences and related fields. ▯ In addition, the module aims to develop students' understanding of biological processes that support human health and disease, enabling them to explain core mechanisms such as inheritance, metabolism, cellular communication, and microbial interactions. Through this understanding, students become prepared for subsequent modules in genetics, microbiology, biochemistry, physiology, and molecular biology within the biomedical sciences curriculum.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	▯ **At the end of the semester, the student will be familiar with the fundamental principles of biology** and able to describe the major concepts related to cells, biomolecules, genetics, evolution, physiology, and microorganisms. ▯ **At the end of the semester, the student will acquire improved skills in understanding biological processes**, including cell structure, molecular mechanisms, inheritance patterns, metabolism, and the relationships between structure and function in living systems. ▯ **The ability to explain biological concepts clearly and accurately**, and to discuss core topics such as DNA replication, gene expression, cell division, microbial biology, and human physiology in a simple, structured, and scientifically appropriate manner. ▯ **Knowing the basic methods of scientific interpretation**, including how to read biological diagrams, follow biological pathways, and understand how biological principles are applied in health, disease, and biomedical sciences.
Indicative Contents المحتويات الإرشادية	Introduction to Biology: the characteristics of life and levels of biological organization [4 hrs] Chemistry of Life: atoms, water properties, and the major biological macromolecules [6 hrs] Cell Structure and Function: prokaryotic and eukaryotic cells, organelles, and membrane structure [7 hrs] Membrane Transport: diffusion, osmosis, active transport, endocytosis, and exocytosis [4 hrs]

	Energy, Enzymes, and Metabolism: enzyme activity, ATP production, and metabolic pathways [5 hrs] Cell Division: stages of mitosis and meiosis, and cell cycle regulation [4 hrs] Principles of Genetics: Mendelian inheritance, chromosomes, and DNA structure [6 hrs] Gene Expression: transcription, translation, and basic gene regulation [3 hrs] Evolution and Phylogeny: natural selection, evolutionary mechanisms, and simple phylogenetic trees [4 hrs] Basics of Microbiology: structure and function of bacteria and viruses [4 hrs] Introduction to Human Physiology: major organ systems and homeostasis [7 hrs] Revision and problem-solving sessions [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students are taught through communicative approach through which they are encouraged to speak even if they do 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. 4. 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. 5. Collaborative Learning: Using teamwork as an educational strategy through small groups to solve linguistics problems, fostering social interaction and developing communication skills

	6. 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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	64
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	36
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	**Quiz**	1	10% (10)	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 Biology & Scientific Method
Week 2	Chemistry of Life: Biomolecules & Water
Week 3	Cell Structure & Function (Prokaryotes vs Eukaryotes)
Week 4	Membrane Structure, Transport, & Cell Communication
Week 5	**Mid term**
Week 6	Energy, Enzymes, and Metabolism
Week 7	**Midterm**
Week 8	Cell Cycle, Mitosis, and Meiosis
Week 9	**DNA Structure, Replication, and Chromosomes**
Week 10	Gene Expression: Transcription & Translation
Week 11	Principles of Genetics: Mendelian & Non-Mendelian
Week 12	Evolution, Natural Selection & Phylogeny
Week 13	Microbiology: Bacteria, Viruses, and Immune Response
Week 14	Fundamentals of Human Physiology
Week 15	Biotechnology & Genetic Engineering
Week 16	**Final**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Biology** (11th Edition) by Raven, Johnson et al. McGraw-Hill Education	Yes
Recommended Texts	**Essential Cell Biology** (Alberts et al.) https://www.garlandscience.com/essential-cell-biology/	Yes
Websites	• MIT OpenCourseWare – Intro Biology https://ocw.mit.edu/courses/7-01sc-biology-fall-2011/	

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	**Calculus 1**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**AIC1102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UG1	**Semester of Delivery**		1
Administering Department		AIBM	**College**	Artificial intelligence	
Module Leader	Dr.Dahlia Khaled Bahlool		**e-mail**	dahlia.khald@sc.uobaghdad.edu.iq	
Module Leader's Academic Title		Assistant 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. 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	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 الإستراتيجيات	**1.** Lectures on Effective Time Management ● 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.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (hr/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (hr/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
Total SWL (hr/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**	4	16%	5, 10	4
	Assignments	4	16%	3, 14	4
	Projects/Laboratories	___	___	___	___
	Reports	2	8%	___	2
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	2 hours
	Final Exam	3hr	50% (50)	17	3 hours
Total assessment			100% (100 Marks)		

Delivery Plan (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.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	*Weir, M.D., Hass, J., and Giordano, F.R., 2005. Thomas' Calculus. Pearson Education India.*	Yes
Recommended Texts	The Central Library, the Science Library, and the Departmental Repository offer a comprehensive collection of fundamental texts and specialized resources in calculus.	Yes
Websites	– Specialized academic websites. – Virtual library services provide resources that are accessible from international university libraries.	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
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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

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

MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Biomedical Data Science**			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	BMDS 101				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	UG1		**Semester of Delivery**	2	
Administering Department	AIBD		**College**	AIC	
Module Leader	Assist. Prof. Dr. Ali Hussein Hamad		**e-mail**		
Module Leader's Academic Title	Assoc. Prof. Dr.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Assist. Prof. Dr. Ali Hussein Hamad		**e-mail**	ahmad@kecbu.uobaghdad.edu.iq	
Peer Reviewer Name			**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 Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	• Introduce the fundamental concepts, scope, and ecosystem of Biomedical Data Science (clinical, omics, and public-health data). • Understand the ethical and privacy frameworks (HIPAA, GDPR) governing the use of medical data. • Recognize the structure of medical data types and Electronic Health Records (EHR). • Develop competence in exploratory data analysis (EDA) on healthcare datasets using Python. • Build and interpret supervised learning models (regression and classification) for clinical prediction. • Evaluate clinical models using domain-appropriate metrics and understand the impact of class imbalance. • Apply unsupervised learning (clustering and dimensionality reduction) to discover patterns in patient and omics data. • Introduce specialized biomedical topics: survival analysis, biomedical signal and image data, and data integration. • Analyze algorithmic bias and fairness issues in the design and deployment of healthcare data systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Define and explain the fundamental concepts and scope of biomedical data science across clinical, omics, and public-health domains, and the ethical/privacy frameworks (HIPAA, GDPR) that govern medical data. • Use Python (pandas, scikit-learn) to load, clean, and explore real healthcare datasets and electronic health records. • Build and interpret supervised learning models (linear and logistic regression) for clinical prediction and decision support. • Implement and compare classification algorithms (KNN, decision trees) on biomedical data. • Evaluate clinical models using appropriate metrics (sensitivity, specificity, ROC) and reason correctly about class imbalance in rare-disease settings. • Apply unsupervised learning — K-Means, hierarchical clustering, and PCA — to discover patient subtypes and simplify high-dimensional omics data. • Interpret specialized biomedical data: survival (time-to-event) analysis, ECG signals, and medical images. • Integrate multi-modal (genomic + clinical) data and critically assess algorithmic bias and fairness in healthcare applications. • Demonstrate teamwork, communication, and reflective learning through lab-based activities and a final data-science project.
Indicative Contents المحتويات الإرشادية	***Indicative content includes the following:*** • The biomedical data-science ecosystem; clinical, omics and public-health data; ethics and privacy (HIPAA, GDPR). • Medical data structures (categorical, ordinal, continuous, time-series) and Electronic Health Records (EHR). • Exploratory data analysis (EDA) on healthcare data with Python (pandas, matplotlib). • Supervised learning: linear regression for continuous clinical outcomes; logistic regression for clinical decision support. • Classification algorithms: K-Nearest Neighbors and Decision Trees on biomedical data. • Model evaluation: sensitivity, specificity, ROC curves, and the class-imbalance problem in rare-disease prediction.

	• Unsupervised learning: K-Means and hierarchical clustering for patient subtyping and genomics; PCA for dimensionality reduction. • Specialized topics: survival (Kaplan–Meier) analysis; biomedical signal (ECG) and image (X-ray) data; multi-modal data integration and algorithmic bias.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	• Lectures (2 hrs/week): deliver theoretical concepts through interactive presentations and clinical case discussions. • Laboratory sessions (2 hrs/week): guided practical exercises in Python (pandas, scikit-learn, matplotlib) applied to real biomedical datasets (UCI, Kaggle, PhysioNet). • Case studies and ethical debates: encourage critical thinking through real-world clinical examples and privacy/bias scenarios. • Mini projects and group work: promote collaboration through small-scale predictive-modeling and clustering tasks culminating in a final project. • Formative assessment and feedback: quizzes, lab reports, and peer feedback to reinforce learning.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ 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	CLO #1, #2, #7, #8
	Assignments	1	10% (10)	11	CLO #3, #4, #5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	CLO #6, #8, #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	CLO #1 – #5
	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 the ecosystem: What is Biomedical Data Science? (clinical vs. omics vs. public-health data); ethics and privacy — HIPAA and GDPR.
Week 2	Medical data structures: categorical (blood types), ordinal (pain scales), continuous (glucose), time-series (ECG); introduction to Electronic Health Records (EHR).
Week 3	Exploratory Data Analysis (EDA) in healthcare: handling missing values in clinical trials; visualizing patient cohorts (box plots for biomarkers, histograms for age).
Week 4	Linear regression — predicting continuous outcomes: predicting systolic blood pressure from BMI and age; metrics MSE and R^2.
Week 5	Logistic regression — clinical decision support: binary outcomes (disease vs. healthy); risk factors and odds ratios.
Week 6	Classification I — K-Nearest Neighbors (KNN): identifying similar patient profiles for personalized treatment; distance metrics in a biological context.
Week 7	Classification II — Decision Trees: building clinical flowcharts ("If Glucose > X and BMI > Y, then High Risk"); visualizing decision boundaries.
Week 8	Midterm Exam (assessment of Weeks 1–7).
Week 9	Evaluating clinical models: sensitivity, specificity and the ROC curve; why "accuracy" is dangerous in rare-disease prediction (class imbalance).
Week 10	Clustering I — K-Means: discovering patient subtypes (e.g., clusters of asthma patients); the "Elbow Method" for choosing k.
Week 11	Clustering II — Hierarchical Clustering: dendrograms in genomics; grouping genes with similar expression patterns.
Week 12	Dimensionality Reduction: Principal Component Analysis (PCA) to simplify high-dimensional "omics" data for visualization.
Week 13	Survival Analysis basics: introduction to Kaplan–Meier curves (time-to-event data).
Week 14	Signal & image data: basics of processing ECG signals and interpreting X-ray pixels.
Week 15	Data integration & bias: combining genomic and clinical data; addressing algorithmic bias (demographic and socioeconomic factors).
Week 16	Final project presentations / Final Exam (integrating a complete biomedical data-science pipeline).

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered

Week 1	Lab 1: Setting up the Python environment (Jupyter, pandas, scikit-learn).
Week 2	Lab 2: Loading and describing a clinical dataset.
Week 3	Lab 3: EDA on the Pima Indians Diabetes dataset.
Week 4	Lab 4: Regression on the Health Insurance Cost dataset.
Week 5	Lab 5: Disease-risk classification (logistic regression).
Week 6	Lab 6: KNN patient similarity.
Week 7	Lab 7: Decision-tree classifier.
Week 8	Midterm Exam week — no scheduled lab.
Week 9	Lab 8: ROC and confusion-matrix analysis.
Week 10	Lab 9: Clustering with the Wisconsin Breast Cancer dataset.
Week 11	Lab 10: Building and reading a dendrogram.
Week 12	Lab 11: PCA on a gene-expression matrix.
Week 13	Lab 12: Plotting a Kaplan–Meier survival curve.
Week 14	Lab 13: Pneumonia Chest X-ray (Normal vs. Pneumonia) introductory classification.
Week 15	Lab 14: Fairness check on a clinical model.

Learning and Teaching Resources
مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	James, G., Witten, D., Hastie, T., Tibshirani, R., & Taylor, J. (2023). An Introduction to Statistical Learning with Applications in Python. Springer. doi: 10.1007/978-3-031-38747-0 Shortliffe, E. H., & Cimino, J. J. (Eds.) (2021). Biomedical Informatics: Computer Applications in Health Care and Biomedicine (5th ed.). Springer. •	Yes
Recommended Texts	Recent biomedical data-science and machine-learning-in-healthcare survey articles and reports (e.g., IEEE JBHI, Nature Medicine, JAMIA, Elsevier). •	No
Websites	UCI Machine Learning Repository (https://archive.ics.uci.edu); Kaggle — Health datasets (https://www.kaggle.com); PhysioNet / MIMIC (https://physionet.org).	

Grading Scheme مخطط الدرجات				
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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة بغداد
بكالوريوس في الذكاء الاصطناعي/ التطبيقات الطبية الحيوية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية
كل وحدة اوربية = ٢٥ ساعة

MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Bioinformatics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AIBM1203**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UG1		**Semester of Delivery**	2	
Administering Department	AIBD		**College**	AIC	
Module Leader	Dr.Rasha Al-khalidi		**e-mail**	rasha.ali@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Assistant Prof		**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 Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Introduce students to the fundamental concepts of bioinformatics as a discipline bridging biology and computer science. 2. Equip students with practical skills to use core bioinformatics databases and tools (NCBI, GenBank, BLAST, UniProt, PDB) to retrieve, interpret, and analyze biological sequence and structural data. 3. Develop students' ability to interpret sequence alignments, phylogenetic trees, and protein structures in the context of biological function.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the module, the student will be able to: 1. Define bioinformatics and explain its role in modern biological and biomedical research. 2. Describe the structure of DNA, RNA, and proteins and relate sequence to biological function (Central Dogma). 3. Navigate major biological databases (NCBI, GenBank) and retrieve sequence data in standard formats (e.g., FASTA). 4. Apply BLAST to search for sequence similarity and interpret BLAST output (E-value, identity, alignment scores). 5. Construct and interpret phylogenetic trees to describe evolutionary relationships between organisms or sequences. 6. Describe the primary, secondary, tertiary, and quaternary levels of protein structure and their relation to protein function. 7. Perform and interpret pairwise sequence alignments (global and local) and distinguish alignment from database-search approaches such as BLAST.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Bioinformatics — definitions, real-life applications, and biological elements (DNA, RNA, proteins) [2 hrs] DNA and RNA — structure, base complementarity, and types of RNA [2 hrs] The Central Dogma and the role of biological databases [2 hrs] NCBI and GenBank — database structure, accession numbers, and data retrieval (FASTA format) [2 hrs] Sequence alignment and BLAST — concept, types, and key terminology [2 hrs] BLAST scoring and E-value — interpreting BLAST search results [2 hrs] Phylogenetic trees — concepts, components, and clades [2 hrs] Phylogenetic tree construction methods and case study (viral evolutionary analysis) [2 hrs] Amino acids, the peptide bond, and protein secondary structure [3 hrs] Protein tertiary and quaternary structure — folding, domains, and allostery [2 hrs]

	Protein function and databases — enzymes, protein–protein interactions, UniProt, PDB, and AlphaFold [3 hrs] Pairwise sequence alignment — global and local alignment, Needleman–Wunsch and Smith–Waterman [2 hrs] Alignment interpretation — gap penalties, dot plots, and homology [2 hrs] Bioinformatics in practice — applications in genomics, proteomics, and precision medicine [2 hrs] *Total hrs = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)*

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Interactive Lectures: using slides, short videos, and live demonstrations of bioinformatics tools (NCBI, BLAST, EMBOSS Needle). 2. Problem-Based Learning (PBL): case studies such as SARS-CoV-2 spike-protein analysis and viral phylogenetics to apply concepts to real biological problems. 3. Hands-on Practical Sessions: guided use of online bioinformatics tools for sequence retrieval, BLAST searches, alignment, and tree construction. 4. Blended Learning: combining lectures with e-learning materials, recorded demonstrations, and online assignments. 5. Formative Quizzes and Review Questions: short in-class and take-home quizzes to reinforce key concepts after each major topic. 6. Project-Based Learning: a short individual or group project applying bioinformatics tools to a chosen biological sequence, presented in the final weeks.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem)	**50**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quiz**	2	10% (10)	4 & 11	LO #1–#4
	Lab exercises / reports	3	15% (15)	cont.	LO #3–#7
	participation in lecture	—	5% (5)	Continuous	All
	Short project	1	10% (10)	13–15	LO #4–#7
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 Bioinformatics — definitions, real-life applications, and an overview of biological elements (DNA, RNA, proteins).
Week 2	DNA and RNA — molecular structure, base complementarity, and the different types of RNA.
Week 3	The Central Dogma of molecular biology and the role of biological databases in modern research.
Week 4	NCBI and GenBank — record structure, accession numbers and coding sequences (CDS), and data retrieval in FASTA format.

Week 5	Sequence alignment and BLAST — the concept of sequence alignment, types of BLAST, and key terminology.
Week 6	BLAST scoring systems and the E-value — interpreting BLAST search results and identifying significant matches.
Week 7	**Midterm Exam**
Week 8	Phylogenetic trees — concepts, tree components, clades, and types of tree representations.
Week 9	Phylogenetic tree construction methods and a case study on viral evolutionary analysis (e.g., SARS-CoV-2).
Week 10	Amino acids, the peptide bond, and protein secondary structure — alpha helices, beta sheets, and structural motifs.
Week 11	Protein tertiary and quaternary structure — stabilizing forces, domains, fold classification, and allostery.
Week 12	Protein function and bioinformatics databases — enzymes, protein–protein interactions, UniProt, PDB, and AlphaFold structure prediction.
Week 13	Pairwise sequence alignment — global and local alignment, and the Needleman–Wunsch and Smith–Waterman algorithms.
Week 14	Alignment interpretation — gap penalties, dot plots, identity thresholds, and homology.
Week 15	Bioinformatics in practice — applications in genomics, proteomics, and precision medicine.
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Department lecture materials — Introduction to Bioinformatics (AIBD, Year 1)	Yes (course portal)
Recommended Texts	Jin Xiong, Essential Bioinformatics, Cambridge University Press.	Yes

	Arthur M. Lesk, Introduction to Bioinformatics, Oxford University Press.	
Websites	NCBI — https://www.ncbi.nlm.nih.gov/ | BLAST — https://blast.ncbi.nlm.nih.gov/ | UniProt — https://www.uniprot.org/ | RCSB PDB — https://www.rcsb.org/ | EMBOSS Needle — https://www.ebi.ac.uk/jdispatcher/psa/emboss_needle	

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	**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		AIBM	**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.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	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 للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SWL (hr/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8.3
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (hr/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	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**

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	

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

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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	**Probability and Statistics**			**Module Delivery**	
Module Type	core			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	AIC1203				
ECTS Credits	**50**				
SWL (hr/sem)	2				
Module Level	UG1		**Semester of Delivery**	2	
Administering Department	AIBM		**College**	AIC	
Module Leader	Dr. Basad Al-Sarray		**e-mail**	basad.husain@sc.uobaghdad.edu.iq	
Module Leader's Academic Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1	

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.**

أهداف المادة الدراسية	**To develop understanding of data distributions and uncertainty modeling.** **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]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies الإستراتيجيات	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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (hr/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (hr/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	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 and basic concepts of statistics and definitions. Types of data sets, types of sampling and collecting data.

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	*Rohatgi, Vijay K., and AK Md Ehsanes Saleh. An introduction to probability and statistics. John Wiley & Sons, 2015.*	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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(0 – 49)	**F** – Fail	راسب	(0-44)	Considerable amount of work required

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امسح الكود للوصول إلى النسخة الإلكترونية

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

MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information معلومات الوحدة الدراسية					
Module Title	Mathematics for AI			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☐ **Lab** ☒**Tutorial** ☐ **Practical** ☐**Seminar**	
Module Code	CAI1202				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UG1	**Semester of Delivery**		2
Administering Department		AIBM	**College**	AIC	
Module Leader	Dr. Dahlia Khaled Bahlool		**e-mail**	dahlia.khald@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	(-)		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		1/9/2025	**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	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 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**	4	16%	5, 10	4
	Assignments	4	16%	3, 14	4
	Projects / Lab.	___	___	___	___
	Report	2	8%	___	2
Summative assessment	**Midterm Exam**	2 hours	10%	7	2 hours
	Final Exam	3 hours	50%	17	3 hours
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,
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
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	The Central Library, the Science Library, and the Departmental Repository offer a comprehensive collection of fundamental texts and specialized resources in calculus.	Yes
Websites	– Specialized academic websites. Virtual library services provide resources that are accessible from international university libraries.	

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.

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

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**	2	
Administering Department	AIBM		**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]

Learning and Teaching Strategies

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.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 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

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). *Fundamentals of computer graphics*. 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		

Grading Scheme مخطط الدرجات				
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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.