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

دليل وصف البرنامج الأكاديمي والمقرر الدراسي

كلية الامام الأعظم الجامعة /
قسم علوم الحاسبات

للعام الدراسي ٢٠٢٥ - ٢٠٢٦

وصف البرنامج الأكاديمي

اسم الجامعة : كلية الامام الأعظم الجامعة

الكلية : الامام الأعظم الجامعة

القسم العلمي : علوم حاسبات

اسم البرنامج الأكاديمي أو المهني : بكالوريوس / علوم حاسبات

اسم الشهادة النهائية : بكالوريوس علوم حاسبات.

النظام الدراسي : نظام سنوي

تاريخ إعداد الوصف: ٥ / ٩ / ٢٠٢٥

تاريخ ملء الملف: ٥/٩/٢٠٢٥

التوقيع:
اسم رئيس القسم: ا.م.د. نزار صالح عبدالحسين
التاريخ: ٥/٩/٢٠٢٥

الأستاذ المساعد الدكتور
نزار صالح عبد الحسين
رئيس قسم علوم الحاسبات

التوقيع:
اسم المعاون العلمي: أ.د ايمن فاروق محمد
التاريخ : / / ٢٠٢

دُقّق الملف من:
قسم ضمان الجودة والأداء الجامعي
اسم مدير قسم ضمان الجودة والاداء الجامعي :
ا.م.د حميد يونس حميد
التاريخ: / /
التوقيع

أ.م.د حميد يونس حميد
مدير قسم ضمان الجودة والاداء الجامعي

مصادقة السيد العميد

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	Supportive			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMA-١٠٢**				
ECTS Credits					
SWL (hr/sem)	**(١٦ -١)**				
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**		
Module Leader	م.م. محمد حميد محمد		**e-mail**	m.alsomaidy@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Teacher		**Module Leader's Qualification**	Masters	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	IMA-٢٠٢	**Semester**	٣

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. **الحفاظ على سلامة اللغة العربية وتقوية القدرة اللغوية لدى الطلاب واكسابهم مهارة التعبير الصحيح .** ٢. **تمكين الطلاب من مهارات اللغة العربية.** ٣. **تقوية ملكة الطلاب الأدبية لتذوق أساليب اللغة وإدراك مواطن الجمال فيها** ٤. **تنمية قدرات الطلاب ومهاراتهم الخطية والإملائية بحيث يستطيعون الكتابة الصحيحة مع ضرورة استعمال علامات الترقيم .** ٥. **تدريب الطلاب على استخدام القواعد النحوية والصرفية أثناء القراءة والكتابة والتعبير .** ٦. **تنمية الثروة اللغوية للطلاب وتزويدهم بكثير من الألفاظ والتراكيب بفضل ما يعرض عليهم من أمثلة وأساليب .**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **تمكين الطالب من القراءة الصحيحة وان يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً.** • **اعتياد التكلم باللغة العربية يؤثر على العقل والخلق والدين.** • **تطوير مهارات الطلاب في الاستماع والقراءة والتعبير.**
Indicative Contents المحتويات الإرشادية	١. **التوضيح من خلال الرسوم.** ٢. **التوضيح من خلال البوربوينت** ٣. **التوضيح من خلال حل التمارين** ٤. **التوضيح من خلال مشاركة الطلبة.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الاستراتيجية الرئيسية التي سيتم اعتمادها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين، وفي الوقت نفسه تحسين وتوسيع مهارات التفكير لديهم وسيتم تحقيق ذلك من خلال الفصل الدراسي والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض الأنشطة التي تهم الطلاب من خلال السؤال والمناقشة والحوار مع التطبيق.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Homework	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	• قواعد كتابة الهمزة العربية
Week ٢	• الفصل بين الضاد والظاء
Week ٣	• علامات الترقيم والتنقيط
Week ٤	• الكلام وما يتألف منه
Week ٥	• المعرب والمبني
Week ٦	• العلامات الإعرابية الأصلية والفرعية
Week ٧	• علامات الاسم والفعل والحرف
Week ٨	• امتحان نصف الفصل
Week ٩	• الأسماء الخمسة
Week ١٠	• المثنى والملحق به
Week ١١	• جمع المذكر السالم والملحق به
Week ١٢	• جمع المؤنث السالم والملحق به
Week ١٣	• جمع التكسير
Week ١٤	• النكرة والمعرفة
Week ١٥	• العلم – أسماء الإشارة - الأسماء الموصولة

Week ١٦	• إمتحان نهاية الكورس

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	
Week ٨	
Week ٩	
Week ١٠	
Week ١١	
Week ١٢	
Week ١٣	
Week ١٤	
Week ١٥	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	١. شرح ابن عقيل على ألفية ابن مالك / ابن عقيل، عبد الله بن عبد الرحمن العقيلي الهمداني المصري (ت: ٧٦٩هـ)، تحقيق: محمد محيي الدين عبد الحميد، دار التراث ـ القاهرة، دار مصر للطباعة، سعيد جودة السحار وشركاه، ط٢٠، ١٤٠٠ هـ ـ ١٩٨٠ م.	yes

	٢. القواعد الأساسية للغة العربية / للسيد أحمد الهاشمي , قدم له وضبط نصه الدكتور محمد التونجي , مؤسسة المعارف للطباعة والنشر – بيروت , ط٤ ١٤٣٣هـ٢٠١٢م ٠	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Skill (I)**		**Module Delivery**		
Module Type	**Core**		☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**COM-١١٣**				
ECTS Credits					
SWL (hr/sem)					
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**		
Module Leader	أ.م. معن نواف عبود م.تيسير كرم داود		**e-mail**	maan.alani@imamaladham.edu.iq tayseer.alshekly@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Professor Teacher		**Module Leader's Qualification**	Masters	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Computer Skill (II)	**Semester**	٢

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Students will explore and become more familiar with: ١. The concepts of Information & Communication Technology (ICT) and its applications. ٢. The operating systems such as Windows and application software such as Word and Electronic Spreadsheets. ٣. The continuous exchange of data between any two parts of the world. ٤. Data visualization using different tools and applications. ٥. The general programming concepts and related problem-solving strategies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon the completion of the course, students will be able to: ١. The students will have the knowledge to understand the peripheral devices, computer system and the different types of software and skills for managing visual elements, document sources, developing project reports, assignments etc. Which are mandatory at this level of academics. ٢. The students will have the knowledge and skills to create presentations that include academic project presentations, seminars, professional-grade presentations, employee training manuals, instructional materials, and kiosk slideshows. ٣. The students will have the knowledge of the importance of data analysis as a part of strategic growth, allowing students to forecast trends and required actions. ٤. Students will have the knowledge of working independently as well as with a group to deliver effective and well- documented software solutions to all problems. ٥. Students can apply skills by working and completing software-related activities such as MS Word, MS Excel, MS PowerPoint ٦. Mastering the skills taught throughout the course will improve the productivity and the way students are conducting and presenting their work. This course provides students with the basic knowledge and skills that allow them to use different kinds of computer applications.
Indicative Contents المحتويات الإرشادية	١. Indicative content includes the following. ٢. Introduction To Course ٣. computing Basics and Text Processing Essentials ٤. Presentation Graphics Essentials ٥. Advanced Computing Technologies ٦. Self-Learning(Elective) ٧. Others (Exam, PCA)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The class will "meet" the equivalent of two one-hour & fifteen minutes for lecture/discussion each week. Students must have access to the Internet to facilitate demonstrating and using software. Many of the assignments should stress hands-on applications by the students. Each student will be expected to participate in all lectures. Class participation by all is expected.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري

	Material Covered
Week ١	Introduction
Week ٢	Components of Computer System
Week ٣	Concept of Hardware and Software
Week ٤	Concept of computing, data and information
Week ٥	Connecting keyboard, mouse, monitor and printer to CPU
Week ٦	Preparatory week before the final Exam
Week ٧	Basics of Operating System
Week ٨	mid exam
Week ٩	Basics of popular operating system (WINDOWS)
Week ١٠	Operating System Simple Setting
Week ١١	File and Directory Management
Week ١٢	Basic of Computer Networks
Week ١٣	Popular Web Browsing Software's
Week ١٤	Basics of E-mail
Week ١٥	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	Knowing computer
Week ٢	Operating Computer using GUI Based Operating System
Week ٣	network and Operating Computer using GUI Based Operating System
Week ٤	Managing files and folders
Week ٥	Basic networking
Week ٦	Using Word processors, spreadsheets
Week ٧	Exam
Week ٨	Creating simple databases
Week ٩	Online safety and computer security
Week ١٠	Creating simple presentations using PowerPoint
Week ١١	Using social media and email communications
Week ١٢	Image editing
Week ١٣	Simple computer programming concepts

Week ١٤	Basic concept of E-mail
Week ١٥	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Computer Skills and Computer Organization and Information Technology	no
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Differentiation Methods**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	COM-١١٥				
ECTS Credits					
SWL (hr/sem)					
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**		
Module Leader	أ.م.مصطفى محمد عكاوي		**e-mail**	mostafaakawi@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Masters	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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	١. Evaluate limits (as part of Departmental Objectives in Mathematics ٢. Prove basic theorems using limits of the difference equation ٣. Differentiate algebraic and trigonometric functions using key ٤. Find the tangent line to a given graph at a given point
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course, students will: ١. Solve tangent and area problems using the concepts of limits, derivatives, and integrals. ٢. Draw graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point. ٣. Determine whether a function is continuous and/or differentiable at a point using limits. ٤. Use differentiation rules to differentiate algebraic and transcendental functions.
Indicative Contents المحتويات الإرشادية	١. Limits and Continuity Limit of a function, evaluation of limits, continuity. ٢. Differentiation ٣. Derivative of a function, rules of differentiation, higher derivatives.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Develop an effective and time-efficient **homework/study strategy** for, not only your calculus class, but other classes as well. This will help you become a more confident, successful, and well-rounded student. It will lead to a healthier balance between work time and leisure time. Spend at least **two to four hours** on each homework assignment. This affords you extra time to work on challenging homework problems and helps you organize your thoughts, questions, and ideas. The more time you spend on homework, the more likely you are to articulate clear, concise questions to your classmates and teachers. The more time you spend on homework, the less time you will spend on frantic, last-minute preparation for exams. Definitions, formulas, and theorems that are introduced in class or needed to complete homework assignments should be **memorized immediately** . Postponing this until it's needed for the exam will impede your work speed on homework assignments and interfere with clearer and deeper understanding of calculus. Spend time working on calculus **every day** . Doing some calculus every day makes you more familiar with concepts, definitions, and theorems. This familiarity will make calculus get easier and easier one day at a time. Find at least **one or two other students** from your calculus class with whom you can regularly do homework and prepare for exams. Your classmates are perhaps the least used and arguably your best resource. An efficient and effective study group will streamline homework and study time, reduce the need for attendance at office hours,

	and greatly improve your written and spoken communication. The best time to use your classmates as study/homework partners is after you have made an honest effort on your own to solve the problems using your own wits, knowledge, and experience. When you encounter an unsolvable problem, don't give up too soon on it. Being stumped is an opportunity for mathematical growth and insight, even if you never solve the problem on your own. If you seek help prematurely, you will never know if you could have solved a tough problem without outside assistance. Begin preparing/outlining for exams at least **five class days** before the exam. Outlining the topics, definitions, theorems, equations, etc. that you need to know for the exam will help you focus on those areas where you are least prepared. Preparing early for the exam will build your self-confidence and reduce anxiety on the day of the exam. It's also an insurance policy against time lost to illness, unexpected family visits, and last-minute assignments in other classes. Generally speaking, pulling all-nighters and doing last-minute cramming for exams is a recipe for eventual academic disaster. Prepare for exams by working on **new problems** . Good sources for these problems are unassigned problems from your textbook, review exercises and practice exams at the end of each chapter, old hour exams, or old final exams. Studying exclusively from those problems which you have already been assigned and worked on may not be effective exam preparation. Problems for each topic are generally in the same section of the book, so knowing how to do a problem because you know what section of the book it is in could give you a false sense of security. Working on new randomly mixed problems more closely simulates an exam situation, and requires that you both categorize the problem and then solve it. Use **all** resources of assistance and information which are available to you. These include classnotes, homework solutions, office hours with your professor or teaching assistants, and problem sessions with your classmates. Do not rely exclusively on just one or two of these resources. Using all of them will help you develop a broader, more natural base of knowledge and understanding. Expect your exams to be **challenging** . If they are challenging, you will be prepared. If they are not challenging, you can expect to have an easy time getting a very high score !

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	Abbreviations and Notations
Week ٢	Some trigonometric, Slope, Graph and function
Week ٣	Limits: The Idea of Limits. Definitions of Limits. Techniques for Computing Limits.
Week ٤	Limits and Continuity: Infinite Limits. Limits at Infinity. Continuity. Precise Definitions of Limits
Week ٥	Differentiation: Introducing the Derivative. The Derivative as a Function. Rules of Differentiation
Week ٦	Differentiation: The Product and Quotient Rules. Derivatives of Trigonometric Functions. Derivatives as Rates of Change.
Week ٧	Differentiation: The Chain Rule,
Week ٨	Differentiation Implicit Differentiation
Week ٩	Differentiation: The Chain Rule, Implicit DifferentiationPart١
Week ١٠	Differentiation: The Chain Rule, Implicit DifferentiationPart٢
Week ١١	Differentiation: Derivatives of Inverse Trigonometric Functions. Related Rates. Part١
Week ١٢	Differentiation: Derivatives of Inverse Trigonometric Functions. Related Rates. Part٢
Week ١٣	Applications of Derivatives: Maxima and Minima. Mean Value Theorem. What Derivatives Tell Us part ١
Week ١٤	Applications of Derivatives: Maxima and Minima. Mean Value Theorem. What Derivatives Tell Us part ٢
Week ١٥	Review

Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	
Week ٨	
Week ٩	
Week ١٠	
Week ١١	
Week ١٢	
Week ١٣	
Week ١٤	
Week ١٥	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Edwards, C.H. and Penney, D.E. Elementary Differential Equations. Prentice-Hall. (latest ed.).	Yes
Recommended Texts	Thomas, G. and Finney, R. Calculus and Analytic Geometry. Addison-Wesley. (latest ed.).	Yes

	Adams, R. Single Variable Calculus. Pearson Education. (latest ed.).	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Logic**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-١١٤**				
ECTS Credits	**٥**				
SWL (hr/sem)	**١٢٥**				
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**	Alimam Aladham university college	
Module Leader	م. د. همام خالد ياسين		**e-mail**	humam.khalid@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Humam Khalid Yaseen		**e-mail**	humam.khalid@imamaladham.edu.iq	
Peer Reviewer Name	Humam Khalid Yaseen		**e-mail**	humam.khalid@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	١
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 course aims to enable the student to know the design of combinational circuits such as Adder – subtractor circuits, Comparators, Decoder and Encoder, Multiplexer and Demultiplexer circuits, analysis and design of sequential circuits such as flip-flop circuits, Resistors and counters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. Ability to design Adder and Subtractor circuits. ٢. Knowledge of designing encoder and decoder circuits and use it to design other circuits. ٣. Knowledge the Comparator, Multiplexer, Demultiplexer and places of use ٤. Learn how to design an asynchronous and synchronous counters
Indicative Contents المحتويات الإرشادية	١. **Introduction to Digital Logic:** • Basics of digital systems and their importance in modern technology. • Number systems (binary, hexadecimal) and conversions. ٢. **Boolean Algebra:** • Boolean operators (AND, OR, NOT, XOR, NAND, NOR). • Laws and theorems of Boolean algebra. • Simplification of Boolean expressions. ٣. **Combinational Logic:** • Design and analysis of combinational logic circuits. • Multiplexers, decoders, encoders. • Adders and subtractors. • Arithmetic logic units (ALU). ٤. **Project Work:** • Hands-on projects that involve designing and building digital circuits

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١. **Start with Fundamentals:** Begin by introducing the fundamental concepts of digital logic, such as binary numbers and Boolean algebra. Ensure that students have a strong foundation in these basics before moving on to more complex topics. ٢. **Interactive Lectures:** Use engaging and interactive lectures that involve real-life examples and practical applications of logic design. Encourage student participation and questions

	Hands-on Labs: Provide opportunities for students to work with actual logic gates and circuits in a laboratory setting. Hands-on experience is invaluable in understanding how digital logic works **Group Work:** Encourage collaborative group projects where students work together to design and test digital circuits. Group work can stimulate discussion and problem-solving. **Learning strategy:-** ١. **Active Learning:** Engage actively with the subject matter. Solve problems, design circuits, and practice Boolean algebra. ٢. **Regular Practice:** Regularly practice solving logic problems, simplifying Boolean expressions, and designing circuits to reinforce learning. ٣. **Self-Assessment:** Use self-assessment tools like quizzes, practice exams, and online resources to gauge your understanding and identify areas that need improvement. ٤. **Collaboration:** Collaborate with peers through study groups or project teams. Explaining concepts to others can solidify your own understanding. ٥. **Ask Questions:** Don't hesitate to ask questions during lectures or seek clarification from your instructor or peers. Logic design can be challenging, and asking questions is a vital learning strategy. ٦. **Work on Projects:** If your course includes practical projects, take them seriously. Applying what you've learned to real-world projects can deepen your understanding.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٢	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	١
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٦	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٤
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	• Number Systems, and conversions
Week ٢	• Binary arithmetic, Logic Gates, and truth table
Week ٣	• Boolean Algebra and Extract Boolean expression from truth table and from logic circuit
Week ٤	• Logic Simplification
Week ٥	• Half and full adder
Week ٦	• Half and full Subtractor, Another functions of combinational logic circuits
Week ٧	• Function implementation using a decoder
Week ٨	• Encoders
Week ٩	• Multiplexer and Demultiplexer
Week ١٠	• Function implementation using multiplexer
Week ١١	• Mini project
Week ١٢	• Flip-flops
Week ١٣	• Asynchronous counters
Week ١٤	• Synchronous counter
Week ١٥	• **Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	Introduction to combinational design a. OR gate b. AND gate c. NAND gate d. NOR gate
Week ٢	Design and implementation using NAND gate
Week ٣	Design and implementation using NAND gate
Week ٤	Mini Project
Week ٥	Half Adder and Full Adder b. Half Subtractor and Full Subtractor by using Basic gates and NAND gates
Week ٦	Design and implement the decoder
Week ٧	Design and implement the encoder
Week ٨	Mid exam
Week ٩	Multiplexer AND De-multiplexer
Week ١٠	Flip-flops
Week ١١	Test
Week ١٢	counters
Week ١٣	Asynchronous counters & Synchronous counters
Week ١٤	Mini Project
Week ١٥	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital fundamentals Thomas L. Floyd ٢٠١٥	Yes
Recommended Texts		
Websites	http://www.pearsonglobaleditions.com/floyd	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Discrete Structures (I)**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-١١٢**				
ECTS Credits					
SWL (hr/sem)					
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**		
Module Leader	أ.م.د.مصطفى عبد الغفور محمد		**e-mail**	mostafamohammed@imamaladham.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			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Discrete Structures (II)	**Semester**	٢

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. The principal objective of this course is to develop the analytic skills need to learn mathematics. ٢. Studying basic mathematical concepts to solve problems. ٣. To understand analyze systems in a mathematical manner. ٤. This course deals with the basic concept of discrete mathematical. ٥. This is the basic subject for most computer science subjects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least ٦ Learning Outcomes, better to be equal to the number of study weeks. ١. Recognize the basic concepts in a discrete mathematical structure. ٢. To understand the fundamental properties of sets. ٣. Identify the basic sets operations. ٤. To study the sets types and counting principle. ٥. Recognize the relations and functions to describe the relationship between the elements from two sets. ٦. To learn several basic proof techniques. ٧. Discuss the proof techniques to prove important results in set theory. ٨. To studies properties of integers and use the proof techniques to prove some basic facts in number theory. ٩. To understand the fundamental properties of graph. ١٠. To study how representation of functions by using graph. ١١. Discuss the types of graphs and special graph. Explain the Polish notation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. ١. Sets • The basic concepts • Set Operations • Finite sets, counting princple • Classes of sets • Partitions of set ٢. Relations • Representation of relations • Properties of relations • Inverse relations • Composition of relations ٣. Function • One-to-one, onto and invertible functions • Graph of a function • Composition of function ٤. Matrices • Types of Matrices

	• Operations on Matrices

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Discrete mathematics is foundational material for computer science: Many areas of computer science require the ability to work with concepts from discrete mathematics, specifically material from such areas as set theory, logic, graph theory, combinatorics, and probability theory. The main strategy that will be adopted in delivering the discrete mathematical structures module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. The module will include a combination of classes, and interactive tutorials.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	١. Introduction - The basic concepts: Discrete mathematical structure
Week ٢	٢. Sets. ٢,١. Elements.
Week ٣	٣. Sets. ٣,١. Universal set, empty set.
Week ٤	٤. Sets. ٤,١. Subsets.
Week ٥	٥. Sets. ٥,١. Finite Sets, Counting Principle. ٥,٢. Classes of sets.
Week ٦	٦. Sets. ٦,١. Power set. ٦,٢. Cardinality.
Week ٧	٧. Sets. ٧,١. The Cartesian Product. ٧,٢. Partitions of set.
Week ٨	Midterm Exam
Week ٩	٩. Matrices.
Week ١٠	١٠. Matrices. ١٠,١. Types of Matrices.
Week ١١	١١. Matrices. ١١. Operations on Matrices.
Week ١٢	١٢. Matrices. ١٢. Operations on Matrices.
Week ١٣	١٣. Relations.
Week ١٤	١٤. Relations. ١٤,١. Representation of relations.
Week ١٥	١٥. Relations. ١٥,١ Composition of relations.
Week ١٦	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	
Week ٨	
Week ٩	
Week ١٠	
Week ١١	
Week ١٢	
Week ١٣	
Week ١٤	
Week ١٥	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby	Yes
Recommended Texts	Theory and problems of Discrete mathematics, by Seymour Lipschutz & Marc Lars Lipson, Schaum's Outline Series, third edition ٢٠٠٧. - Mathematical foundation of computer science, Y.N. Singh, ٢٠٠٥. - Discrete Mathematics and Its Applications, Seventh Edition, Kenneth H. Rosen, AT&T Laboratories, ٢٠١٢.	
Websites	- http://www.math.uvic.ca/faculty/gmacgill/guide	

	- http://en.wikibooks.org/wiki/Discrete_mathemati cs/Set_theory

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language (I)**			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	IMA-١٠٣				
ECTS Credits	١				
SWL (hr/sem)	٢٥				
Module Level	١		**Semester of Delivery**		
Administering Department			**College**	Imam aladham university college	
Module Leader	ا.م.د. فاروق نهاد عبيد		**e-mail**	farookalbadry@imamaladham.edu.iq	
Module Leader's Acad. Title	Teacher		**Module Leader's Qualification**	Master	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	English Language (II)	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objectives of the syllabus are: ١. Enhance the ability to communicate effectively in both spoken and written English. This includes improving pronunciation, fluency, and vocabulary. ٢. Provide a solid understanding of English grammar rules and sentence structure to facilitate clear and accurate communication. ٣. Expand the students' vocabulary to enable them to express themselves more precisely and with a richer range of language. ٤. Develop the skills needed to understand and interpret various types of written texts, ranging from simple to complex, such as articles, essays, and literature. ٥. Improve the ability to express thoughts and ideas in writing, including the development of essays, reports, and other written forms. ٦. Enhance the ability to understand spoken English in various contexts, including conversations, lectures, and audiovisual materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	These outcomes aim to cover the key aspects of language learning, including the four main language skills (listening, speaking, reading, and writing), as well as cultural awareness, critical thinking, and adaptability to different contexts. Adjustments can be made based on the specific level of the course (beginner, intermediate, advanced) and any specialized goals or themes of the course.
Indicative Contents المحتويات الإرشادية	The indicative content for an English Language course encompasses a comprehensive exploration of language skills, grammar, and cultural awareness. Beginning with an introduction to the global significance of English, the course delves into the development of speaking, listening, reading, and writing skills. Grammar and syntax are addressed with a focus on understanding parts of speech, sentence structures, and common errors. Vocabulary building includes exploration of idioms, collocations, and academic terminology. Cultural dimensions of language use and the promotion of critical thinking are integrated, along with practical applications in professional and academic communication. The course also addresses digital literacy in an English context, preparing students for language proficiency tests and fostering an understanding of global English varieties. Students engage in an independent project, allowing for the exploration of a personally relevant English language topic. This indicative content provides a flexible framework for instructors to tailor the course to specific goals and student needs.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The coursework assessment for the English Language course, accounting for ١٠٪ of the overall grade, incorporates a multifaceted approach to evaluating students' language proficiency. Assessment components encompass individual and group oral presentations, oral interactions including pair work, written tests and tasks, essays, listening/viewing exercises, communicating the gist of simple reading passages, and translation of basic texts on economics. This diverse set of evaluations ensures a comprehensive measurement of students' abilities in both spoken and written English, including critical thinking, comprehension, and application of language skills in the context of economic themes. The inclusion of various tasks reflects a commitment to assessing language proficiency in a well-rounded manner, encompassing both collaborative and independent language competencies.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	١٧	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	١
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٨	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٢
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	**Alphabet, basic greetings, introductions, and common expressions.**
Week ٢	**Numbers, simple vocabulary related to daily life.**
Week ٣	**Describing yourself, family, and friends.**
Week ٤	**Introducing likes and dislikes, hobbies.**
Week ٥	**Daily routines, telling time, and talking about activities.**
Week ٦	**Present simple tense, adverbs of frequency.**
Week ٧	**Vocabulary related to food, ordering in a restaurant.**
Week ٨	**Mid exam**
Week ٩	**Shopping vocabulary, asking for and giving directions.**
Week ١٠	**Vocabulary related to places (city, neighborhood, etc.).**
Week ١١	**Prepositions of place, asking and giving directions.**
Week ١٢	**Past simple tense, talking about past events.**
Week ١٣	**Storytelling and writing short narratives.**
Week ١٤	**Review of key concepts and language points.**
Week ١٥	**Cultural topics, holidays, and traditions.**
Week ١٦	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	

Week ٨	
Week ٩	
Week ١٠	
Week ١١	
Week ١٢	
Week ١٣	
Week ١٤	
Week ١٥	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	https://elt.oup.com/catalogue/items/local/ae/new_headway_plus/?cc=global&selLanguage=en	yes
Recommended Texts		
Websites	https://elt.oup.com/catalogue/items/local/ae/new_headway_plus/?cc=global&selLanguage=en	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠٫٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤٫٥ will be rounded to ٥٥, whereas a mark of ٥٤٫٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Programming**			**Module Delivery**	
Module Type	COM-١١١			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	Core				
ECTS Credits					
SWL (hr/sem)					
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**	Imam aladham university college	
Module Leader	م.تيسير كرم الشيخلي		**e-mail**	tayseer.alshekly@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Masters	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Programming Fundamentals	**Semester**	٢

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The educational objectives of this course are ١. To Focus Fundamentals of Computers and Peripherals ٢. To Introduce programming language and aware the students about programming paradigm ٣. To Focus Concept and Methodology of Programming ٤. Brief the students regarding Object Oriented Programming Features ٥. To give clear idea of different strategy of basic programming with C like Looping, Decision Making, Array, Structure, Function, Pointer, etc. to solve real life problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- On successful completion of the course, the student will be having the basic knowledge of programming paradigm, fundamentals of computer and peripherals and thus being prepared with the programming spectrum in depth as desired. ٢- Student will be able to effectively solve any real-life problem and lead the exploration of new application and techniques for their use.

Indicative Contents
المحتويات الإرشادية
	• Introduction to Computer Programming
	• Basics of C++ language
	• Problem Solving and Algorithm Design
	• Pseudo-codes and Flow charts
	• Arithmetic Operators and Variables
	• Exploring input and output statements
	• Control Structure (Selection and iterative)
	  ○ Functions
	• Primary data structure of Arrays and its multi – dimensional behavior.
	  ○ Concepts of Pointers
	• Introductory knowledge of Structures

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures • Tutorials • Problem solving • Lab • Case study • Small project

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

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	Introduction – History of programming languages. Low-level languages and High-level languages.
Week ٢	Problem solving - Flowcharts and pseudocode algorithms.
Weeks ٣,٤,٥ and ٦	Introduction to C/C++ programming language: • History of C/C++ • C++ standard Library. • C++ Environment. • General structures of C/C++ • programming language. • Data types. • Variables declaration/definition.

	• Directives. • Inputs and outputs. Simple programming
Week ٧	Mid-term Exam
Week ٨	Arithmetic and operators: Arithmetic operators. Operator's precedence. Equality and relational operators. Sequences.
Weeks ٩ and ١٠	Control Structures: • Selection and Decisions: • if • if…else. • nested if • switch
Weeks ١١,١٢ **and** ١٣	Control Structures: • Iteration: • for • while • do while
Weeks ١٤ **and** ١٥	Array: • Array definition (one-dimensional array). • operations on array (add, subtraction, multiplication and invers of array).
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	Problem solving and Algorithms
Week ٢	Introduction to C/C++ Integrated development Environments (IDE).
Weeks	Introduction to C/C++ programming. Writing simple programs that involve using

٣ and ٤	input/output statements. identify and fix common syntax errors.
Weeks ٥ and ٦	Data type, Operators, and Expressions
Weeks ٧,٨,٩ and ١٠	Control structure writing program using if, if..else, switch, for, while &do…while control structure
Weeks ١١,١٢ and ١٣	Array (one-dimensional array). Operations on array

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The Complete Reference Borland C++, By Herbert Schildt, Mc_GrawHill	No
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Organization**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	COM-123				
ECTS Credits	5				
SWL (hr/sem)					
Module Level		1	**Semester of Delivery**		2
Administering Department		Computer science	**College**		
Module Leader	أ.م.د. نزار صالح عبد الحسين		**e-mail**		
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**	nazarsalih@imamaladham.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-113	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understanding the Basic Components: The module aims to familiarize students with the fundamental components of computer systems, including the CPU (Central Processing Unit), memory, input/output devices, and storage devices. Students should gain an understanding of the purpose and functionality of each component. 2. Learning about Instruction Set Architecture: Students will learn about different instruction set architectures, such as the von Neumann architecture, Harvard architecture, and reduced instruction set computing (RISC) architecture. The module aims to provide an understanding of the design principles behind instruction sets and their impact on computer performance. 3. Understanding Processor Design: The module aims to delve into the design and operation of processors, including topics such as control unit design, arithmetic logic units (ALUs), pipelining, and parallel processing. Students should gain an understanding of how processors execute instructions and the factors affecting their performance. 4. Studying Memory Systems: This module aims to cover different types of memory systems, including cache memory, main memory (RAM), and secondary storage (hard drives, solid-state drives). Students should understand the organization, hierarchy, and access methods of these memory systems, as well as their impact on system performance. 5. Exploring Input/Output Systems: The module aims to provide an understanding of input/output (I/O) systems and their interface with the CPU and memory. Topics covered may include I/O devices, interrupt handling, I/O techniques (e.g., programmed I/O, interrupt-driven I/O, DMA), and I/O performance considerations. 6. Discussing Parallel Processing and Multiprocessing: Students may learn about the concepts of parallel processing and multiprocessing, including techniques such as parallel algorithms, multi-core processors, and parallel architectures. The module aims to explore the benefits and challenges of parallel computing. 7. Analyzing Performance Evaluation: The module may introduce techniques for evaluating the performance of computer systems, including benchmarking, measurement metrics, and performance analysis. Students should gain the ability to assess and compare the performance of different computer systems. 8. Understanding Operating Systems: The module aims to provide students with an understanding of operating systems, including their purpose, functionalities, and components. Topics covered may include process management, memory management, file systems, device management, and scheduling algorithms. Students should gain knowledge of the key concepts and mechanisms used in operating systems. 9. Discussing System Maintenance and Administration: The module may cover system maintenance and administration principles, including software updates, patch management, system monitoring, troubleshooting, and system backup and recovery. Students should gain knowledge of the practices and tools used in maintaining and administering system software. 10. Understanding Software Functionality: The module aims to familiarize students with the functionality and features of application software,

	specifically focusing on tools and applications within productivity suites like Microsoft Office. This includes word processing, spreadsheet analysis, presentation creation, and database management.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic components of computer systems, including the CPU, memory, input/output devices, and storage devices. 2. Demonstrate knowledge of different system architectures and their impact on computer performance. 3. Understand instruction set architectures and their design principles. 4. Explain the design and operation of processors, including control unit design, ALUs, pipelining, and parallel processing. 5. Understand memory systems, including cache memory, main memory, and secondary storage, and their impact on system performance. 6. Describe input/output systems and their interface with the CPU and memory, including I/O devices, interrupt handling, and I/O techniques. 7. Discuss parallel processing and multiprocessing concepts, including parallel algorithms and architectures. 8. Analyze the performance of computer systems using benchmarking and performance evaluation techniques. 9. Understand the purpose, functionalities, and components of operating systems. 10. Demonstrate knowledge of system programming, including system calls, libraries, drivers, and low-level programming. 11. Understand virtualization and emulation principles and their applications. 12. Demonstrate knowledge of system security concepts and practices. 13. Understand system maintenance and administration principles, including software updates, system monitoring, and troubleshooting. 14. Demonstrate proficiency in using application software tools and features within the productivity suite (e.g., Microsoft Word, Excel, PowerPoint): a. Create and edit documents, spreadsheets, presentations, and databases effectively and efficiently. b. Utilize formatting options, templates, and styles to enhance the visual appeal and professionalism of documents. c. Use formulas, functions, and data analysis tools to manipulate and analyze data in spreadsheets. d. Design visually appealing and engaging presentations using multimedia elements and slide transition effects. 15. Apply best practices for efficient software usage: a. Navigate the user interface and menu options to locate and utilize software features effectively. b. Utilize keyboard shortcuts and automation features to enhance productivity and streamline tasks. c. Optimize workflow and utilize time-saving techniques within the software. 16. Communicate effectively through the creation of professional-looking documents and presentations: a. Create clear, concise, and well-organized documents with appropriate formatting, headings, and sections. b. Design visually appealing slides with effective use of text, images,

	charts, and other multimedia elements. c. Utilize collaboration and sharing features to facilitate teamwork and effective communication. 17. Analyze and visualize data using spreadsheet software: a. Organize and manipulate data effectively using tables, filters, and sorting features. b. Utilize formulas, functions, and data analysis tools to perform calculations and derive insights from data. c. Create informative charts, graphs, and pivot tables to visualize data and present findings effectively. 18. Demonstrate problem-solving skills and troubleshoot common software issues: d. Identify and resolve common software-related challenges and errors. a. Seek out appropriate resources and support channels to resolve problems independently. b. Apply critical thinking and problem-solving strategies when encountering software-related issues. 19. Manage information effectively and maintain data integrity and security: a. Organize and store files and data in a structured and easily retrievable manner. b. Manage document versions, track changes, and utilize collaboration features to ensure data integrity. c. Apply security measures to protect sensitive information and maintain confidentiality. 20. Demonstrate an ability and willingness to learn and adapt to new software features and advancements: a. Stay updated with software updates and new features within the application software. b. Explore online resources, tutorials, and communities to expand knowledge and skills. c. Display a mindset of continuous learning and adaptability in using application software.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Basic Components of Computer Systems: [٦ hours] • CPU (Central Processing Unit) • Memory (Primary and Secondary) • Input/Output Devices • Storage Devices 2. System Architecture: [٦ hours] • Instruction Sets • Data Representation • Memory Hierarchy • Caches and Cache Organization 3. Processor Design: [٦ hours] • Control Unit Design • Arithmetic Logic Units (ALUs)

- Pipelining and its Challenges
- Parallel Processing and Multi-core Processors

4. Memory Systems: [6 hours]
    - Cache Memory
    - Main Memory (RAM)
    - Secondary Storage (Hard Drives, Solid-State Drives)
    - Virtual Memory
5. Input/Output Systems: [٦ hours]
    - I/O Devices
    - Interrupt Handling
    - Programmed I/O, Interrupt-Driven I/O, DMA
    - I/O Performance Considerations
6. Parallel Processing and Multiprocessing: [١.٥ hours]
    - Parallel Algorithms
    - Multi-core Processors
    - Parallel Architectures
    - Performance Considerations and Challenges
7. Performance Evaluation: [١.٥ hours]
    - Benchmarking
    - Measurement Metrics
    - Performance Analysis Techniques
    - Comparing and Assessing Computer System Performance

Indicative Contents for System Software:

1. Operating Systems: [6 hours]
    - Purpose and Functions of Operating Systems
    - Process Management
    - Memory Management
    - File Systems
    - Device Management
    - Scheduling Algorithms
2. System Maintenance and Administration: [3 hours]
    - Software Updates and Patch Management
    - System Monitoring and Troubleshooting
    - System Backup and Recovery
    - Performance Tuning
3. System Maintenance and Administration: [٣ hours]
    - Software Updates and Patch Management
    - System Monitoring and Troubleshooting
    - System Backup and Recovery
    - Performance Tuning

	Indicative Contents for Studying Application Software (e.g., Microsoft Office): 1. Introduction to Productivity Suites: [٣ hours] - Overview of productivity suites and their significance in various professional contexts. - Introduction to the features and components of popular productivity suites like Microsoft Office. 2. Word Processing Software (e.g., Microsoft Word): [٣ hours] - Creating, editing, and formatting documents. - Working with text, paragraphs, and styles. - Inserting and formatting images, tables, and other graphical elements. - Utilizing document templates and mail merge functionality. - Collaboration and reviewing features. 3. Spreadsheet Software (e.g., Microsoft Excel): [٣ hours] - Creating, formatting, and managing spreadsheets. - Working with formulas, functions, and calculations. - Data manipulation and analysis techniques. - Creating charts, graphs, and pivot tables. - Spreadsheet automation and advanced features. 4. Presentation Software (e.g., Microsoft PowerPoint): [٣ hours] - Creating and formatting slides. - Inserting and formatting text, images, shapes, and multimedia elements. - Utilizing slide layouts, transitions, and animations. - Designing effective presentations for different audiences and purposes. - Collaboration and presentation delivery techniques. ٥. Document Security and Protection: [٣ hours] - Applying document security measures, password protection, and encryption. - Managing document permissions and access controls. - Ensuring data integrity and confidentiality within productivity suites.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Active Learning: • Actively engage with the material by reading, taking notes, and asking questions. • Participate in discussions, group activities, and practical exercises. • Seek opportunities for hands-on practice and application of concepts through exercises, projects, and real-world examples. 2. Practical Application: • Apply the learned concepts in practical scenarios, such as building and analyzing computer systems, designing software solutions, or

creating documents and presentations using application software.

- Seek out real-world examples and case studies to understand how the concepts are applied in practice.
- Undertake practical projects or assignments to gain hands-on experience.

3. Experimentation and Exploration:
   - Explore and experiment with different computer architectures, operating systems, and application software to gain a deeper understanding.
   - Set up virtual environments or use online simulators to experiment with various software configurations and settings.
   - Explore additional features and functionalities beyond the basics, going beyond the prescribed curriculum to expand knowledge.
4. Collaborative Learning:
   - Engage in group discussions, study groups, or online forums to share knowledge, exchange ideas, and discuss complex topics.
   - Collaborate with peers on projects or assignments to enhance learning through teamwork and shared problem-solving.
5. Continuous Practice and Review:
   - Regularly practice the learned concepts through exercises, assignments, or self-assessment quizzes.
   - Review and reinforce knowledge through periodic revision of key topics.
   - Seek feedback from instructors or mentors to identify areas for improvement and further learning.
6. Utilize Resources:
   - Make use of textbooks, lecture notes, online tutorials, and supplementary resources to enhance understanding and clarify concepts.
   - Explore online resources, forums, and communities related to the subject to access additional learning materials, discussion threads, and expert guidance.
7. Stay Updated:
   - Keep up-to-date with the latest advancements, trends, and updates in the field of computer organization, system software, and application software.
   - Follow relevant industry news, blogs, and publications to stay informed about emerging technologies and best practices.
8. Time Management and Regular Study:
   - Allocate dedicated study time for each subject to ensure consistent progress and understanding.
   - Break down the learning material into manageable chunks and create

	a study schedule. • Avoid procrastination and maintain discipline in adhering to the study plan. 9. Seek Support: • Seek guidance and support from instructors, teaching assistants, or mentors when encountering difficulties or complex concepts. • Participate in office hours or seek clarification during lectures or tutorials. 10. Reflect and Apply Learning: • Regularly reflect on the learning process, strengths, and areas for improvement. • Apply the acquired knowledge in practical situations to reinforce understanding and develop practical skills. • Connect the learned concepts to real-world applications and scenarios

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1-5 , LO# 10-14
	Assignments	2	10% (10)	2, 12	LO #10-14, LO#14-16
	Seminar	1	10% (10)	11	LO # 5-11
	Report	1	10% (10)	12	LO # 5-11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-17
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: Computer Overview
Week 2	Computer Functions
Week 3	Introduction of Computer System Components
Week 4	Computer System Components: Processor Components
Week 5	Computer System Components: Internal Memory (RAM and ROM)
Week 6	Computer System Components: Storage Devices (secondary storage)
Week 7	Internal Hardware Computer Components: Power supply, Computer case, Internal cables
Week 8	Introduction of External Hardware Computer Components - Input Devices
Week 9	External Hardware Computer Components - Output Devices
Week 10	Introduction of System Software
Week 11	Computer Software - Operating Systems
Week 12	Computer Software - Utility Programs
Week 13	Application Software – M.S. Word
Week 14	Application Software – M.S. Excel
Week 15	Application Software – M.S. PowerPoint
Week 16	Preparatory week before the final exam.

Delivery Plan (Weekly Lab. Syllabus): المنهاج الاسبوعي للمختبر:	
	Material Covered
Week 1	Lab1_ Introduction of Computer Organization to understand the internal workings of the CPU and memory.
Week 2	Lab2_ Computer architecture simulations: Use simulation tools to explore different computer architectures, such as the von Neumann architecture or pipelined processors.
Week 3	Lab3_ Memory hierarchy experiments: Measure and analyze the performance of different levels of cache memory and understand their impact on system performance.
Week 4	Lab4_ System Software Lab: Operating system installation and configuration: Install and configure different operating systems (e.g., Windows) on virtual machines or physical hardware.
Week 5	Lab5_ Document processing and formatting using M.S. Word: Create and format documents using word processing software, applying different styles, headers, footers, and page layouts.
Week 6	Lab6_ Spreadsheet analysis and data manipulation using M.S. Excel: Perform data analysis tasks, such as sorting, filtering, and creating formulas and functions in spreadsheet software.
Week 7	Lab7_ Presentation design and delivery using M.S. PowerPoint: Create visually appealing presentations with multimedia elements and practice delivering effective presentations.

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Computer Organization and Design: The Hardware/Software Interface" by David A. Patterson and John L. Hennessy. 2. "Computer Organization and Architecture: Designing for Performance" by William Stallings. 3. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne. 4. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne.	Yes
Recommended Texts	1. "Structured Computer Organization" by Andrew S. Tanenbaum and Todd Austin. 2. "Operating Systems: Internals and Design Principles" by William Stallings. 3. "Exploring Microsoft Office 2019" by Mary Anne Poatsy, Keith Mulbery, Cynthia Krebs, and Lynn Hogan.	No
Websites	https://ccms.tu.edu.iq/csd/electronic-lectures/409-stage1-8.html	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Discrete Structures (II)**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☐Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**COM-122**				
ECTS Credits					
SWL (hr/sem)					
Module Level	1		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader	Dr. Bashar Ibrahim Hameed		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-112	**Semester**	1
Co-requisites module	none	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The principal objective of this course is to develop the analytic skills need to learn mathematics. 2. Studying basic mathematical concepts to solve problems. 3. To understand analyze systems in a mathematical manner. 4. This course deals with the basic concept of discrete mathematical. 5. This is the basic subject for most computer science subjects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the basic concepts in a discrete mathematical structure. 2. To understand the fundamental properties of sets. 3. Identify the basic sets operations. 4. To study the sets types and counting principle. 5. Recognize the relations and functions to describe the relationship between the elements from two sets. 6. To learn several basic proof techniques. 7. Discuss the proof techniques to prove important results in set theory. 8. To studies properties of integers and use the proof techniques to prove some basic facts in number theory. 9. To understand the fundamental properties of graph. 10. To study how representation of functions by using graph. 11. Discuss the types of graphs and special graph. Explain the Polish notation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Logic • Propositions and compound statements • Compound proposition • Constructing a Truth Table • Tautologies and contradictions • The Algebra of propositions 2. Graphs • Types of the graphs • Degree • Connectivity • Tree graph • Labeled and weighted graphs • Spanning Trees • Representing Graphs in Computer Memory • Rooted tree • Algebraic Expressions and Polish Notation 3. Modeling Computation • Finite state machines FSM • Input and Output Tapes • Equivalent State & Minimize Finite State Machine h • Finite Automata

	• Deterministic Finite State Automata 4. Mathematic induction

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• The teaching and learning strategies for this module are designed to strengthen students' analytical and logical thinking skills, which are essential for computer science and related disciplines. • The module adopts a **student-centered learning approach**, encouraging active participation through problem-solving activities, guided discussions, and in-class exercises to enhance understanding of discrete mathematical concepts. • **Lectures** are used to introduce fundamental theories, definitions, and principles, supported by illustrative examples that link abstract concepts to computational and real-world applications. • **Interactive tutorials and problem-solving sessions** are integrated to reinforce theoretical knowledge, develop logical reasoning, and improve students' ability to construct mathematical proofs. • Students are encouraged to engage in **independent learning** through assigned homework, self-study, and exploration of additional examples to deepen conceptual understanding and improve problem-solving proficiency. • **Collaborative learning** is promoted through group discussions and peer-assisted learning, enabling students to exchange ideas, clarify misconceptions, and develop communication skills. • **Continuous formative assessment**, including quizzes, assignments, and homework, is used to monitor student progress, provide timely feedback, and support continuous improvement. • Digital and traditional learning resources, such as lecture notes, textbooks, and supplementary materials, are utilized to support diverse learning styles and enhance knowledge retention.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Online assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Homework	2	10% (10)	4 and 13	LO #5, #6 and #8, #9
	Report	1	10% (10)	10	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 Logic & Propositions
Week 2	Logical Connectives & Compound Statements
Week 3	Conditional & Biconditional Logic
Week 4	Logical Equivalence & Tautologies
Week 5	Laws of Logic (Algebra of Propositions)
Week 6	Polish Notation (Prefix & Postfix)
Week 7	Evaluation of Expressions
Week 8	Mid-term Exam
Week 9	Fundamentals of Finite State Machines (FSM)
Week 10	State Tables and State Diagrams (Digraphs)
Week 11	Machine Operation and I/O Sequences
Week 12	Congruence and Machine Minimization
Week 13	Finite State Automata (FSA)
Week 14	Languages and Deterministic FSA
Week 15	FINAL-term Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Theory and problems of Discrete mathematics, by Seymour Lipschutz & Marc Lars Lipson, Schaum's Outline Series, third edition 2007.	Yes
Recommended Texts	- Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby - Mathematical foundation of computer science, Y.N. Singh, 2005. - Discrete Mathematics and Its Applications, Seventh Edition, Kenneth H. Rosen, AT&T Laboratories, 2012.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Integration Methods**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-125**				
ECTS Credits					
SWL (hr/sem)					
Module Level	1		**Semester of Delivery**	2	
Administering Department	COM		**College**	Al-Imam Al-Adham University College	
Module Leader	Farook Nehad Abed		**e-mail**	farookalbadry@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Professor		***Module Leader's Qualification***	*Ph.D*	
Module Tutor			***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	COM-115	**Semester I**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Students will explore and become more familiar with: 1. Integration methods and their applications in area, volume, and length. 2. Types of Definite and Indefinite Integrals. 3. Uses of Integrals and Their Applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course, students will: 1. Gain knowledge and understanding of the types of integrals. 2. Gain knowledge and understanding of the techniques of integration. 3. Gain knowledge and understanding of the applications of integration.
Indicative Contents المحتويات الإرشادية	1. Introduction to integral: ➢ Definition and concept of integration. ➢ Relationship between integration and differentiation. ➢ The definite and indefinite integrals. ➢ Fundamental Theorem of Calculus. 2. Techniques of Integration: ➢ Basic integration rules and formulas. ➢ Integration by substitution. ➢ Trigonometric integrals. ➢ Integration of exponential function. 3. Applications of Integration: ➢ Calculation of areas and the area under a curve ➢ Calculation of volumes. ➢ Length of curves.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Develop an effective and time-efficient homework/study strategy that applies not only to your calculus class but also to other classes. This strategy will help you become a more confident, successful, and well-rounded student while maintaining a healthy balance between work and leisure time. 1. Allocate Sufficient Time: By daily practice, set aside time every day, at least two to four hours for each homework assignment, and work on calculus. Tackle challenging problems by organizing your thoughts and questions with immediate memorization of definitions, formulas, and theorems as soon as they are introduced in class in order to reduce the need for preparation before exams. 2. Study Partners: Find one or two classmates from your calculus class with whom you can regularly do homework in order to consistently practice, which enhances familiarity with concepts, definitions, and theorems, making calculus progressively easier over time. Collaborating with peers streamlines homework and study time, reduces the need for excessive office hours, and improves communication skills. It's advisable to attempt the problems individually before seeking help, as struggling with challenging problems fosters growth and insight.

	3. Early Exam Preparation: Begin outlining and preparing for exams at least five class days in advance. Creating a study plan helps identify areas where you need more preparation and builds self-confidence by working on new problems using a variety of resources, such as unassigned textbook problems, review exercises, practice exams, and previous exams. As a result, it will test your ability to categorize and solve problems effectively, and you should expect a challenge and be prepared for challenging exams in order to achieve high scores. By following this strategy, you can optimize your learning experience, excel in your coursework, and maintain a healthy work-life balance.

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Howe works	4	10% (10)	2,4 and 8,11	LO #1, #2 and #3, #4
	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 integrals.
Week 2	Indefinite Integral.
Week 3	Integral by Substitution.
Week 4	Integration by Substitution.
Week 5	Definite Integral.
Week 6	Fundamental Theorem of Calculus.
Week 7	Evaluating Definite Integral by Substitution.
Week 8	Mid-exam.
Week 9	Area between Two Curves.
Week 10	Volume by Disk & Washer Method.
Week 11	Volume by Cylindrical Shells.
Week 12	Arc Length.
Week 13	Surface Area.
Week 14	Logarithmic and Exponential Functions.
Week 15	Preparatory week before the final Exam.
Week 16	Final exam.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Edwards, C.H. and Penney, D.E. Elementary Differential Equations. Prentice-Hall. (latest ed.).	NO
Recommended Texts	Thomas, G. and Finney, R. Calculus and Analytic Geometry. Addison-Wesley. (latest ed.). Adams, R. Single Variable Calculus. Pearson Education. (latest ed.).	NO
Websites		

Grading Scheme
مخطط الدرجات

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Web Design and Programming**			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COM-126**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader	Mohammed Adnan Mohammed		**e-mail**	mohammed.adnan@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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	Students will explore and become more familiar with: 1. Creating a basic HTML, CSS, and JavaScript scripts. 2. Designing a web page with HTML. 3. Creating HTML forms. 4. Styling the pages with CSS. 5. Using JavaScript to make the web pages more flexible. 6. Implementing some basic debugging techniques
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding Web design fundamentals: Students will gain knowledge of the fundamental components of design. 2. Web Development Technologies: Students will learn various web development technologies and frameworks, such as HTML, CSS, JavaScript, and popular libraries like React or Vue.js or Angular. They will acquire the skills needed to build interactive and dynamic web pages. 3. Web Design Principles: Students will be introduced to the principles of user-centered design, including user experience (UX) and user interface (UI) design concepts. They will learn how to create visually appealing and userfriendly web interfaces. 4. Web Performance Optimization: Students will learn techniques for optimizing web application performance, including minimizing load times, reducing file sizes. They will understand the importance of website speed and performance for user experience and search engine rankings. 5. Web Accessibility: Students will gain an understanding of web accessibility standards and guidelines, ensuring that web applications are inclusive and usable by individuals with disabilities. They will learn techniques to improve accessibility and compliance with accessibility regulations. 6. Testing and Debugging: Students will learn testing strategies and techniques for web applications, including unit testing, integration testing, and debugging. They will understand the importance of testing for ensuring the quality and reliability of web applications.
Indicative Contents المحتويات الإرشادية	1. Indicative content includes the following. 2. Introduction To Course 3. Introduction HTML 4. Introduction CSS 5. Introduction JavaScript 6. Others (Exam, PCA)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Lectures serve as the foundation for delivering theoretical concepts, principles, and frameworks of web engineering.

	2. Case Studies: Presenting case studies of successful web applications or notable web engineering projects can provide valuable insights into industry practices, challenges, and innovative solutions. 3. Group Discussions and Debates: Encouraging group discussions and debates on web programming topics can foster critical thinking, collaboration, and communication skills. 4. Online Resources and Tutorials: Providing students with access to online resources, tutorials, and learning platforms can supplement their understanding of web engineering concepts. 5. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, help gauge students' understanding and progress. Constructive feedback can guide students in improving their skills and knowledge. 6. Continuous Learning and Professional Development: Encouraging students to stay updated with the latest advancements in web programming and providing resources for self-study can foster a culture of continuous learning.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ **15** اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #6
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #5, #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	12	LO #3, #4 and #5, #6
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	Web introduction and terminologies
Week 2	Website structure and conventions
Week 3	Web development fundamentals
Week 4	HTML fundamental tags
Week 5	HTML5 new tags and semantic tags
Week 6	Styling with CSS and CSS Selectors
Week 7	Fonts and Colors
Week 8	Midterm exam
Week 9	CSS Animations
Week 10	Forms in HTML
Week 11	JavaScript Basics
Week 12	JavaScript interaction With the DOM
Week 13	Responsive Design and Media Queries
Week 14	Bootstrap intro, Grid System, Components
Week 15	Review
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	IDE intro, website structure, web page structure
Week 2	HTML text, formatting, semantic, links
Week 3	HTML attributes
Week 4	HTML lists, tables
Week 5	HTML multimedia tags
Week 6	HTML forms and validations
Week 7	CSS inline, internal, external
Week 8	CSS selectors

Week 9	CSS animations
Week 10	CSS media queries
Week 11	JavaScript fundamentals, calculator program
Week 12	JavaScript fundamentals, DOM manipulation program
Week 13	Bootstrap fundamentals, grid system
Week 14	Bootstrap components
Week 15	Review
Week 16	**Final exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Internet & World Wide Web How to Program (5th ed.), Deitel, Deitel,and Deitel, Prentice Hall, 2012	No
Recommended Texts	Learning Web Design, Jennifer Robbins, O'Reilly, 2012	
Websites	https://www.w3schools.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Programming Fundamentals**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	COM-121				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	com		**College**	IMA	
Module Leader	Zaineb Riyadh Khalil		**e-mail**	Zainebalani81@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
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	**COM-111**	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The educational objectives of this course are 1- Demonstrate a thorough understanding of modular programming by designing programs that require the use of programmer-defined functions. 2- Demonstrate a thorough understanding of arrays by designing and implementing programs that search and sort arrays. 3- Demonstrate a thorough understanding of the object-oriented programming concepts of encapsulation, data abstraction and composition by designing and implementing classes including the use of overloaded functions and constructors. 4- Demonstrate a thorough understanding of the concept of pointers and dynamic memory allocation by designing and implementing programs using pointers and dynamic memory allocation. 5- Demonstrate a thorough understanding of the implementation of programmer-defined functions and classes by writing code, performing unit testing and debugging of multiple complex programs. 6- Demonstrate good documentation style in all of the programs written in this course. 7- Demonstrate proficiency in implementing data validation code, performing unit testing, and developing test plans while implementing robust solutions to the assignments in this course. 8- Demonstrate a thorough understanding of stream input/output for both console and files. 9- Demonstrate an understanding of the differences between C and C++ in the areas of strings, pass by reference/passing pointers, and structs by designing and implementing programs that use C strings, C++ strings, C language structs and classes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be exposed to the following concepts and/or skills at an introductory concepts level: 1- The analysis and design of programs based on requirements and performance considerations. 2- evaluation of various possible technical solutions. 3- object-oriented design consideration. 4- system integration. 5- program documentation. 6- program debugging procedures. 7- developing program testing plans. 8- consideration of program operating environment. 9- use of reusable software.
Indicative Contents المحتويات الإرشادية	Introduction to the C++ programming language and its subset, Program structure, blocks, storage types, console and file I/O, functions, arrays, strings, pointers, call-by-reference, call-by-value, and dynamic memory

	allocation. The concept and use of classes will be covered in some detail. Differences between C, C++. Some new features in C++ will be introduced.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• Lectures • Tutorials • Problem solving • Lab • Case study • Small project

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	LO #1, #2 and #6, #8
	Assignments	1	10% (10)	12	LO #3, #4 and #6, #7
	Projects / Lab.	2	20% (20)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #9
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered

Week 1	Functions
Week 2	Function types
Week 3	Recursion
Week 4	Array (Two-dimensional array).
Week 5	Operations on a two-dimensional array
Week 6	String Processing
Week 7	Array and functions
Week 8	Mid-term Exam
Week 9	Structures
Week 10	Array of Structures , Nested Structures
Week 11	Stack and Queue
Week 12	Classes and objects
Week 13	Pointers
Week 14	Dynamic Memory allocation
Week 15	Report discussion
Week 16	Preparatory for the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Writing Code using functions
Week 2	Writing Code using function types
Week 3	Writing Code using recursion
Week 4	Writing Code using Array (Two-dimensional array).
Week 5	Writing Code using operations on a two-dimensional array
Week 6	Writing Code using string Processing
Week 7	Writing Codes using Arrays and Functions
Week 8	Mid exam
Week 9	Writing code using structures
Week 10	Array of Structures, Nested Structures
Week 11	Writing Codes using Stack and Queue
Week 12	Writing Code using Classes and Objects
Week 13	Writing Code using Pointers
Week 14	Writing Code Pointers

Week 15	Prepare for the final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	C++: The Complete Reference, Fourth Edition, Herbert Schildt.	Yes
Recommended Texts	The C++ Programming Language, Third Edition, Bjarne Stroustrup.	Yes
Websites	http://www.cplusplus.com/ https://www.w3schools.com/cpp/	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**حقوق الانسان والديمقراطية**			**Module Delivery**	
Module Type	S			☒Theory ☒Lecture ☐Lab ☒Tutorial ☐Practical ☐Seminar	
Module Code	IMA- 104				
ECTS Credits	٢.٠٠				
SWL (hr/sem)	٢				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**		
Module Leader	م. م. ضياء جاسم محمد		**e-mail**	dyaa. jasim@imamaladham.edu.iq	
Module Leader's Acad. Title	مدرس مساعد		**Module Leader's Qualification**	ماجستير	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	2026\1\26		**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. المساهمة في ترسيخ افكار معتدلة عند الطلبة بعيدة عن الغلو والتطرف. ٢. التعرف على موضوع حقوق الانسان واهميتها في الحضارات القديمة والمعاصرة ٣. التعرف على ابرز اجيال حقوق الانسان ٤. دور الامم المتحدة في حماية حقوق الانسان. ٥. تكوين اساس قوي للطالب في موضوع حقوق الانسان والديمقراطية. ٦. تحقيق تفكير متطور في فهم اغلب مواضيع الحقوق والديمقراطية.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	تحقق مادة حقوق الانسان و الديمقر اطيه في الجامعات مجموعة من المخر جات التعلمية للطلاب. وفيما يل ي بعض المخر جات المحتملة لهذه المادة: 1 - الفهم العميق لمفاهيم حقوق الانسان والديمقر اطية: يمكن للطلاب أن يكتسبوا فهمً ا شاملاً لمفاهيم . حقوق الانسان والديمقر اطية ومبادئها الأساسية، بما ف ي ذلك حقوق الإنسان، وحرية التعبير والمساواة، وحوكمة القانون . 2 - تعزيز الحوار والاحتر ام المتبادل: يمكن للطلاب أن يتعلموا كيفية المشار كة في حوار ات بنّاءة و متعاونة وتقدير واحترام وجهات نظر الاخرين حتى في حالة اختلاف الرأي . 3 - تعزيز الوعي بالمواطنة : يمكن للطلاب ان يكتسبوا وعيا اكبر بمسؤولياتهم كمواطنين ودورهم في المجتمع وتعزيز المواطنة النشطة والمشاركة الاجتماعية
Indicative Contents المحتويات الإرشادية	• حفظ الحقوق والواجبات حسب المحاضرات • الطريقة الجماعية • الطريقة الفردية • الطريقة الترديديه • الطريقة الجماعية • رسوم توضيحية • مقاطع سماعية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١- القاء المحاضرات الوجاهية واستخدام وسائل التكنلوجيا الحديثة . ٢- التعليم التشاركي الصفي والمشاركة والتعبير عن الافكار. ٣- التعليم التفاعلي والحوار والنقاش . ٤- التعلم عن طريق الحالات الدراسية والاطلاع على البحوث المكتبية ومراجعة المعلومات الحديثة الواردة في الانترنيت .

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

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4 and 11	
	واجبات بيتية	10	10% (10)	مستمر	
	المشاركات في الصف	1	10% (10)	مستمر	
	Projects / Lab.				
	الاختبارات	1	10% (10)	13	عن اي محاظره من المحاظرات
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	مقدمة في حقوق الانسان والديمقراطية التعريف ومقارنته
Week 2	اهميه حقوق الانسان في الحضارات القديمه
Week 3	اهمية حقوق الانسان في العصور الوسطى
Week 4	اهميه حقوق الانسان في العصور الحديثة
Week 5	امتحان شهري
Week 6	الاعتراف الدولي المعاصر لحقوق الانسان
Week 7	الاعتراف الاقليمي المعاصر لحقوق الانسان
Week 8	اختبار نصف الفصل
Week 9	مضامين حقوق الانسان في المواثيق الدولية

Week 10	مضامين حقوق الانسان في المواثيق الاقليمية
Week 11	مضامين حقوق الانسان في التشريعات الوطنية
Week 12	امتحان شهري
Week 13	اجيال حقوق الانسان
Week 14	ضمانات حقوق الانسان الدستورية)
Week 15	دور منظمة الامم المتحدة
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	حقوق الانسان	Yes
Recommended Texts	١- مجموع من المحاضرات مختارة	
Websites	- https://youtu.be/fpXW6nZC7WE?si=iclZ33RViuNPIYeH	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	الاداء المتميز
	B - Very Good	جيد جدا	80 - 89	فوق المتوسط مع بعض الاخطاء
	C – Good	جيد	70 - 79	عمل سليم مع وجود اخطاء واضحة
	D – Satisfactory	متوسط	60 - 69	عادل
	E – Sufficient	مقبول	50 - 59	العمل يلبي الحد الادنى من المعايير
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	مطلوب المزيد من العمل
	F – Fail	راسب	(0-44)	مطلوب كمية كبيرة من العمل

ملاحظة:- سيتم تقريب العلامات العشرية الموجودة اعلى او اسفل الى العلامة الكاملة الاعلى او الادنى (على سبيل المثال سيتم تقريب علامة 01.0 الى 0 ' بينما سيتم تقريب علامة 54.4 الى 01. تتبع سياسة الجامعة الى عدم التسامح مع حالات الفشل والقريبة من النجاح لذا فان التعديل الوحيد للدرجات التي منحها المصححون الاصليون هو التقريب التلقائي الموضح اعلاه.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Quran memorization 1			**Module Delivery**	
Module Type	S			☒Theory ☒Lecture ☐Lab ☒Tutorial ☐Practical ☐Seminar	
Module Code	IMA- 105				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	2	
Administering Department	COM		**College**	Al-Imam Al-Adham University College	
Module Leader	Mohammed hameed mohammed		**e-mail**	m.alsomaidy@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	Master's	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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	١. ترسيخ حب القرآن الكريم في نفوس الطلبة وتنمية الرغبة في حفظه وتلاوته. ٢. تمكين الطلبة من حفظ الجزء الأول من القرآن الكريم (من سورة الفاتحة إلى نهاية سورة البقرة) حفظًا متقنًا. ٣. إكساب الطلبة مهارة التلاوة الصحيحة وفق أحكام التجويد الأساسية. ٤. تدريب الألسنة على الأسلوب القرآني واكتساب ثروة لغوية رفيعة القدر. ٥. الإسهام في تحصين الطلبة فكريًا من الانحراف نحو الأفكار الهدامة والغلو والتطرف، وبناؤهم على الفكر الوسطي المعتدل. ٦. تعويد الطلبة على المراجعة المستمرة والمحافظة على الحفظ. ٧. غرس الطمأنينة والاستقرار النفسي في قلوب الطلبة من خلال الارتباط بالقرآن الكريم. ٨. ربط الطالب بالمعاني العامة للآيات بما يعزز الجانب الإيماني والأخلاقي لديه. ٩. إعداد الطالب ليكون قادرًا على إكمال حفظ الأجزاء اللاحقة بيسر وثبات.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	. بعد إتمام هذه المادة يُتوقع من الطالب أن يكون قادرًا على: ١. حفظ الجزء الأول من القرآن الكريم حفظًا صحيحًا ومتقنًا. ٢. تلاوة السور المحفوظة تلاوة مجودة خالية من الأخطاء الظاهرة. ٣. إظهار القدرة على الربط بين الآيات المتشابهة والتمييز بينها. ٤. الالتزام ببرنامج مراجعة منتظم يضمن ثبات الحفظ وعدم نسيانه. ٥. التحلي بأخلاق القرآن الكريم والاقتداء بهديه في التعامل والسلوك. ٦. اكتساب أسلوب لغوي رفيع من خلال التدريب على ألفاظ القرآن الكريم وتراكيبه. ٧. تعزيز الفكر الوسطي المعتدل والتحصين من الغلو والتطرف. ٨. استحضار بعض المعاني العامة والوقفات التربوية في السور المحفوظة. ٩. تنمية السلوك الإيماني والخلقي المستمد من القرآن الكريم في الحياة اليومية. ١٠. الشعور بالطمأنينة والاستقرار النفسي من خلال التعلق بالقرآن الكريم.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الارشادي ما يلي: ١. مقاطع سماعية. ٢. رسوم توضيحية. ٣. طريقة القراءة الفردية. ٤. طريقة القراءة الجماعية. ٥. طريقة القراءة الترديدية الفردية ٦. طريقة القراءة الترديدية الجماعية.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١- إعطاء الواجبات البيتية لغرض التقوية والحفظ. ٢- القراءة الصوتية من قبل الأستاذ على الطلبة. ٣- اتباع طرق القراءة الأربعة وحسب ما يراه الاستاذ (الجماعية والفردية والترديدية والجماعية الترديدية). ٤- الاستماء الى المقاطع الصوتية المعدة من قبل الاستاذ

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	17	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.13
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	33	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1 and #8 #10
	homework	10	10% (10)	continuous	LO #3 #4 and #7 #9
	classwork	10	10% (10)	continuous	LO #2 #5 and #6 #9
	Projects / Lab.				
	Report	1	10% (10)	13	LO #1 - #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	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	حفظ سورة البقرة من الآية رقم (1) الى الآية رقم (16)
Week 2	حفظ سورة البقرة من الآية رقم (17) الى الآية رقم (24)
Week 3	حفظ سورة البقرة من الآية رقم (25) الى الآية رقم (29)
Week 4	حفظ سورة البقرة من الآية رقم (30) الى الآية رقم (37)
Week 5	حفظ سورة البقرة من الآية رقم (38) الى الآية رقم (48)
Week 6	حفظ سورة البقرة من الآية رقم (49) الى الآية رقم (57)
Week 7	حفظ سورة البقرة من الآية رقم (58) الى الآية رقم (61)

Week 8	اختبار نصف الفصل
Week 9	حفظ سورة البقرة من الآية رقم (62) الى الآية رقم (76)
Week 10	حفظ سورة البقرة من الآية رقم (77) الى الآية رقم (88)
Week 11	حفظ سورة البقرة من الآية رقم (89) الى الآية رقم (101)
Week 12	حفظ سورة البقرة من الآية رقم (102) الى الآية رقم (112)
Week 13	حفظ سورة البقرة من الآية رقم (113) الى الآية رقم (126)
Week 14	حفظ سورة البقرة من الآية رقم (127) الى الآية رقم (141)
Week 15	اختبار واستماع
Week 16	اختبار نهاية الفصل

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	القرآن الكريم	Yes
Recommended Texts	١- تفسير القرآن الكريم (محد علي الصابوني)	Yes
Websites	- https://youtu.be/fpXW6nZC7WE?si=iclZ33RViuNPIYeH	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computation Theory**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢١٣**				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	IMA	
Module Leader	*Nazar Salih Abdulhussein*		**e-mail**	nazarsalih@imamaladham.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	٠٤/٠٩/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-١٢٢	**Semester**	١
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 course focuses on computability and computational complexity theory, covering topics such as regular and context-free languages, decidable and undecidable problems, reducibility, recursive function theory, and more. Key objectives include: Developing precise mathematical thinking skills, including careful definitions and critical argument analysis. Understanding finite and infinite computational models and their limitations. Gaining insight into problems that are unsolvable or too costly to compute, and exploring practical approaches to these challenges. Formally reasoning about computational costs and proving bounds on problem-solving efficiency. Discovering intriguing aspects of theoretical computer science and their relevance to practical computing systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- Understanding fundamental concepts of probability and statistical inference. ٢- Knowledge of basic statistical calculations and the software tools used for analysis. ٣- Ability to identify components of a univariate statistical model in real-world scenarios. ٤- Proficiency in using standard statistical software and accurately interpreting the output generated.
Indicative Contents المحتويات الإرشادية	In this course, we will develop abstract models of computing machines to investigate what they can and cannot compute efficiently. A key objective is to help you grasp how theoretical computer scientists approach these questions and link that theory to practical computing issues. Additionally, we'll explore applications in cryptography that leverage hard-to-solve problems and discuss strategies for dealing with unsolvable or overly complex problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١. Automata and Language Theory (٢ Weeks) Key Topics: Finite Automata: Introduce the concepts of Deterministic Finite Automata (DFA) and Non-deterministic Finite Automata (NFA). Discuss their equivalence and applications in recognizing regular languages.

	Regular Expressions: Teach how regular languages can be described using regular expressions and their equivalence to finite automata. Demonstrate the use of regular expressions in practical applications (e.g., text processing). Push-down Automata (PDA): Introduce PDAs and their relation to context-free languages. Discuss the additional power PDAs provide over finite automata. Context-Free Grammars (CFGs): Define CFGs and show their relation to push-down automata. Discuss parsing and language generation. Pumping Lemmas: Teach the pumping lemma for regular languages and context-free languages. Use it to prove that certain languages are not regular or not context-free. Suggested Activities: Problem sets on designing automata and CFGs. Exercises on proving language properties using pumping lemmas. ٢. Computability Theory (٣ Weeks) Key Topics: Turing Machines: Introduce the model of a Turing machine (TM). Discuss its importance in defining computability. Show examples of simple Turing machines. The Church-Turing Thesis: Explain the thesis and its implications regarding the limits of computability. Decidability: Define decidability and introduce decidable and undecidable problems. Discuss examples such as the membership problem for context-free languages. The Halting Problem: Teach the classic proof of the undecidability of the halting problem. Discuss its consequences. Reducibility: Introduce reducibility (e.g., many-one reductions) as a technique for proving undecidability of other problems. The Recursion Theorem: Teach the recursion theorem and its implications in computability. Suggested Activities:

Exercises on constructing Turing machines for different computational problems.

Proving the undecidability of problems through reductions.

٣. Complexity Theory (٧ Weeks)

Key Topics:

Time and Space Complexity: Introduce asymptotic notation and complexity measures (time and space). Discuss complexity classes like linear time, polynomial time, exponential time, etc.

Complexity Classes:

P, NP, NP-complete: Define class P (problems solvable in polynomial time), NP (problems verifiable in polynomial time), and NP-complete problems. Discuss the concept of polynomial-time reductions.

L and NL: Introduce space complexity classes such as L (logarithmic space) and NL (non-deterministic logarithmic space).

PSPACE: Discuss PSPACE, problems solvable in polynomial space, and PSPACE-complete problems.

BPP: Define probabilistic polynomial time and its relevance in randomized algorithms.

IP: Introduce interactive proof systems and the class IP. Explain the significance of results like IP = PSPACE.

Complete Problems: Study examples of NP-complete, PSPACE-complete, and other complete problems.

The P vs NP Problem: Present the P versus NP conjecture and its significance in theoretical computer science.

Quantifiers and Games: Discuss complexity classes using alternating quantifiers and how games can represent complex problems (e.g., two-player games).

Hierarchy Theorems: Explain the time and space hierarchy theorems, showing the existence of problems with increasing complexity.

Provably Hard Problems: Identify and study problems that are provably hard (e.g., EXP-complete problems).

	Relativized Computation and Oracles: Introduce the idea of relativization and how it relates to separations of complexity classes. Probabilistic Computation: Explore the role of randomness in computation. Interactive Proof Systems: Discuss the theory behind interactive proofs and probabilistic verification. Suggested Activities: Problem sets on proving complexity class membership. Practice with NP-completeness reductions. Discussions on the significance of P vs NP and possible breakthroughs. Suggested Resources: Textbooks: Introduction to the Theory of Computation by Michael Sipser. Computational Complexity: A Modern Approach by Sanjeev Arora and Boaz Barak. Online Tools: Use online simulators for DFA, NFA, PDA, and Turing machines to give students hands-on experience with abstract concepts.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٦٠	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٣,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٥٠	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,٤
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٠٠		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	Introduction, Finite Automata, Regular Expressions
Week ٢	Nondeterminism, Closure Properties, Regular Expressions → Finite Automata
Week ٣	The Regular Pumping Lemma, Finite Automata → Regular Expressions, CFGs
Week ٤	Pushdown Automata, CFG ↔ PDA
Week ٥	The CF Pumping Lemma, Turing Machines
Week ٦	TM Variants, the Church-Turing Thesis
Week ٧	Decision Problems for Automata and Grammars
Week ٨	**Midterm Exam**
Week ٩	P and NP, SAT, Poly-time Reducibility
Week ١٠	NP-Completeness
Week ١١	Cook-Levin Theorem
Week ١٢	Space Complexity, PSPACE, Savitch's Theorem
Week ١٣	PSPACE-Completeness
Week ١٤	Games, Generalized Geography
Week ١٥	L and NL, NL = coNL
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Sipser, Michael. *Introduction to the Theory of Computation*. ٣rd ed. Cengage Learning, ٢٠١٢. ISBN: ٩٧٨١١٣٣١٨٧٧٩٠.	Yes
Recommended Texts		no
Websites	https://ocw.mit.edu/courses/١٨-٤٠٤j-theory-of-computation-fall-٢٠٢٠/pages/lecture-notes/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Data Structure**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢١٢**				
ECTS Credits	٦				
SWL (hr/sem)	١٥٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department			**College**		
Module Leader	assist lecturer. Hiba hadi		**e-mail**		
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	MA	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	٠١/٨/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-١٢١	**Semester**	١
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. Gain knowledge about fundamental concepts of data structures, its importance and how they impact the efficiency of future coding skills. ٢. Differentiate between various types of data structure and how it can be utilized in problem solving. ٣. Developing the student's ability to create and manipulate these structures, setting the stage for more advanced topics. ٤. Sharpening the student's programming skills by implementing data structure types in prestigious programming language by mockup real world problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. Understands different types of data structure and differentiate between them. ٢. Gain the ability to choose the right data structure according to the problem. ٣. Discusses basic DS such as stacks, queues, arrays, pointers, linked list and its applications. ٤. Explain the Graph ٥. Identify the Heaps and its operations ٦. Describes search trees such as binary search trees ٧. Develops skills in implementations and applications of data structures. ٨. Implements basic data structures such as stacks, queues and trees. ٩. Applies algorithms and data structures in various real-life software problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Data Structures • What is Data Structure: Types, Classifications and Applications • Common operations on various Data Structures Array Data Structure • Introduction • Looping • invariants • Search, insert and delete in an array Linked List and pointers Data Structure ١. Singly Linked List: • Introduction to Linked List • Linked List vs Array • Linked List Insertion • Linked List Deletion (Deleting a given key) • Find Length of a Linked List (Iterative and Recursive) • Merge Sort for Linked Lists ٢. Circular Linked List: • Circular Linked List Introduction and Applications, • Circular Singly Linked List Insertion Stack Data Structure • Introduction to Stack • Infix to Postfix Conversion using Stack • Reverse a String using Stack

	• Design and Implement Stack Data Structure Queue Data Structure • Queue Introduction • Applications of Queue Data Structure • Priority Queue Introduction • Deque (Introduction and Applications) **Graphs** • Graph terminology • Implementing graphs • Relations between graphs • Planarity • Traversals – systematically visiting all vertices Binary Tree Data Structure • Binary Tree Introduction • Binary Tree Properties • Types of Binary Tree • Applications of tree data structure • BFS vs DFS for Binary Tree • Diameter of a Binary Tree • Maximum Depth or Height of a Tree • Maximum width of a binary tree Binary Search Tree Data Structure • Search and Insert in BST • Deletion from BST • Minimum value in a Binary Search Tree • In order predecessor and successor for a given key in BST • Check if a binary tree is BST or not • Total number of possible Binary Search Trees with n keys Heap Data Structure • Binary Heap • Why is Binary Heap Preferred over BST for Priority Queue? • Heap Sort • Binomial Heap • Fibonacci Heap

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. • Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. • Attendance is compulsory in lecture which carries ١٠ marks in overall evaluation. • One internal exam will be conducted as a part of internal theory evaluation. • Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation. • Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation. • The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. • Experiments shall be performed in the laboratory related to course contents.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٩٠	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٥,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٧٠	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٤,٧
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٥٠		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٤ and ٨	LO #١, #٢ and #٣
	Assignments	٢	١٠٪ (١٠)	٦ and ١٤	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٥	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introduction to Data structures and types.
Week ٢	Arrays (introduction, types, looping, search, insert, delete).
Week ٣	Arrays cont. (introduction, types, looping, search, insert, delete).
Week ٤	The Pointer and its operations, applications.
Week ٥	Linked list (introduction, application, arrays vs. linked list, and types of linked list).
Week ٦	Linked list types (insertion, deletion, iterative, recursive).
Week ٧	Mid- term Exam.
Week ٨	The Stack introduction, application, operations and implementation.
Week ٩	The Queue introduction, application, operations and implementation.
Week ١٠	The Graph.
Week ١١	Trees (Binary Tree: Introduction, Properties, Types, and Applications).
Week ١٢	The Heaps and its operations (binary heap, heap sort).
Week ١٣	Binomial Heap, Fibonacci Heap implementation and application.
Week ١٤	Binary Search Tree operation, application types and implementation.
Week ١٥	Binary Search Tree operation, application types and implementation.
Week ١٦	final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	Introduction to structures & pointers in C.
Week ٢	Stack operations Write a program to perform PUSH, POP, PEEP & CHANGE operations on Stack.
Week ٣	Stack operations Write a program to implement insertion & deletion
Week ٤	Queue Operations Write a program to implement insertion & deletion in a circular
Week ٥	Circular Queue Operations Write a program for linked list insertion, deletion & copy
Week ٦	Write a program Operations Write a program to insertion
Week ٧	Mid- term Exam.
Week ٨	Sorting and searching : Write a program to perform • Selection sort • To sort the given number using bubble sort.
Week ٩	Queue Operations Write a program to implement insertion & deletion in a circular
Week ١٠	Write a Program to Implement a Graph Matrix

Week ١١	Sorting and searching : Write a program to operations • insertion • deletion • Sequential and binary search.
Week ١٢	Stack operations Write a program to min & &insertion & deletion
Week ١٣	Stack operations Write a program to perform insert, getting, extracting & delete operations on Stack
Week ١٤	Sorting and searching : Write a program to perform • Merge sort • Quick sort • Sequential and binary search
Week ١٥	Sorting and searching : Write a program to perform • Merge sort • Quick sort • Sequential and binary search
Week ١٧	final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	١- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, ٢nd Ed ٢-Tremblay J.P and Sorenson P.G, An introduction to data structures with applications, Tata McGraw Hill, ٢nd Edition	Yes
Recommended Texts	١-Fundamentals of Data Structures in C++-By Sartaj Sahani.	yes
Websites	https://www.tutorialspoint.com/data_structures_algorithms/dsa_quick_guide.htm https://www.geeksforgeeks.org/data-structures/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠٫٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤٫٥ will be rounded to ٥٥, whereas a mark of ٥٤٫٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Object Oriented Language**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**COM-٢١١**				
ECTS Credits	٧				
SWL (hr/sem)	١٧٥				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	cos	
Module Leader	Zeinab R. Khaleel		**e-mail**	Zainebalani٨١@imamaladham.edu.iq	
Module Leader's Acad. Title	Assist.Lect		**Module Leader's Qualification**	MSC	
Module Tutor	Mohammed Hameed Khudhair AL-Qaraghuli		**e-mail**	Mohammed.hameed@imamaladham.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	٠١/٠٨/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Programming Language١**	**Semester**	١
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 educational objectives of this course are

١- **Understanding Core Concepts of OOP:**

- **Classes and Objects:** Understanding the foundational building blocks of OOP, including how to define classes (blueprints) and create objects (instances of classes).
- **Encapsulation:** Learning how to bundle data (attributes) and methods (functions) that operate on the data into a single unit or class, promoting data hiding and reducing complexity.
- **Inheritance:** Grasping how new classes can be derived from existing ones, allowing for code reuse and the creation of hierarchical class structures.
- **Polymorphism:** Understanding how different classes can be treated as instances of the same class through interfaces, allowing for flexibility in code through method overriding and overloading.
- **Abstraction:** Learning to focus on essential qualities of an object while hiding unnecessary details, making complex systems easier to manage.

٢- **Developing Problem-Solving Skills:**

- **Modeling Real-World Systems:** Teaching students to represent real-world entities as objects, helping to develop systems that are intuitive and maintainable.
- **Design Patterns:** Introducing common design patterns that solve recurring problems in OOP, fostering best practices in software development.
- **Code Reusability:** Emphasizing the importance of creating reusable, modular code that can be easily extended and maintained.

٣- **Improving Software Design and Architecture:**

- **Software Design Principles:** Educating students on principles like SOLID (Single Responsibility, Open/Closed, Liskov Substitution, Interface Segregation, Dependency Inversion) to create well-structured and robust code.
- **Object-Oriented Analysis and Design (OOAD):** Training students to analyze and design software systems using OOP principles, focusing on creating scalable and maintainable architectures.

٤- **Enhancing Team Collaboration and Code Maintenance:**

- **Version Control Integration:** Learning to use version control systems (e.g., Git) in the context of OOP projects to manage code changes collaboratively.
- **Code Documentation and Comments:** Understanding the importance of documenting code, especially in large, object-oriented projects, to facilitate collaboration and maintenance.
- **Testing and Debugging:** Gaining skills in writing unit tests for classes and objects, and learning debugging techniques specific to object-oriented codebases.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**١. Knowledge and Understanding:** • **MLO ١:** Demonstrate a comprehensive understanding of the fundamental principles of Object-Oriented Programming, including concepts such as classes, objects, inheritance, polymorphism, encapsulation, and abstraction. • **MLO ٢:** Understand and apply the principles of software design and architecture, including the use of design patterns and best practices in OOP. • **MLO ٣:** Explain the benefits and limitations of the OOP paradigm in software development, including its impact on code reusability, maintainability, and scalability. **٢. Cognitive/Intellectual Skills:** • **MLO ٤:** Analyze real-world problems and design effective OOP solutions by modeling appropriate classes, objects, and relationships. • **MLO ٥:** Critically evaluate and apply design patterns to solve common software design problems. • **MLO ٦:** Assess the trade-offs between different object-oriented designs in terms of efficiency, complexity, and scalability. **٣. Practical/Professional Skills:** • **MLO ٧:** Develop and implement object-oriented software using a relevant programming language (e.g., Java) that adheres to industry standards and best practices. • **MLO ٨:** Apply techniques for debugging, testing, and maintaining object-oriented code, including the use of unit tests and version control systems. • **MLO ٩:** Work collaboratively in a team environment to design and develop a substantial object-oriented software project, demonstrating effective communication and project management skills. **٤. Key Transferable Skills:** • **MLO ١٠:** Demonstrate problem-solving skills by breaking down complex problems into manageable components using OOP techniques. • **MLO ١١:** Communicate technical information effectively, both verbally and in writing, through documentation, code comments, and presentations. • **MLO ١٢:** Adapt to new and emerging technologies in object-oriented programming, demonstrating lifelong learning and the ability to stay current with industry trends.
Indicative Contents المحتويات الإرشادية	The indicative content of an Object-Oriented Programming (OOP) course includes an introduction to core concepts like classes, objects, inheritance, encapsulation, polymorphism, and abstraction, along with advanced topics such as composition vs. inheritance, design patterns, and SOLID principles. It also covers object-oriented analysis and design (OOAD), practical implementation in a chosen programming language, and testing/debugging techniques. Students will work on hands-on projects, including collaborative team development, integrating OOP with databases, and exploring modern frameworks and libraries. The course concludes with discussions on contemporary OOP languages, emerging trends, and the future direction of software development.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• Lectures • Tutorials • Problem solving • Lab • Case study • Small project

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٩٠	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٦,٦
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٦٠	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٥
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٧٥		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	٣	١٠٪ (١٠)	٤ and ٩	LO #١, #٢ and #١٠, #١١
	Assignments	٣	٥٪ (٥)	٥ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	٢	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٢hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	Principles of Programming
Weeks ٢,٣	Simple Class (Class, Object, Calling Member Functions)

Weeks ٤,٥,٦	Object as Function Arguments , Return Object from Function
Week ٧	Mid-term Exam
Weeks ٨,٩	Constructor and Destructor
Weeks ١٠ and ١١	Constructor overloading
Weeks ١٢ and ١٣	Static and Constant Members (Object and Functions)
Week ١٤	Friend Functions and Friend Class
Week ١٥	The This Pointer
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Weeks ١ and ٢	Many Simple OOP programs to explain class structure.
Weeks ٣ and ٤	Objects and arguments passing in and out class methods
Weeks ٥,٦ and ٧	Constructor and Destructor examples
Weeks ٨ and ٩	Constructor overloading deep explain.
Weeks ١٠,١١ and ١٢	Static and Constant Members (Object and Functions) examples
Weeks ١٣ and ١٤	Examples to apply Friend Functions and Friend Class
Week ١٥	Apply THIS pointer in class

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	• Programming in java Vaskaran Sarcar “Interactive Object-Oriented Programming In Java • A apache netbeans compiler and/or IDE. There are many out there	Yes
Recommended Texts	▪ Think Like a Programmer, An Introduction to Creative Problem Solving ▪	No
Websites	١-http://www.oracle.com	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	SOFTWARE ENGINEERING			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level	٢		**Semester of Delivery**	٤	
Administering Department	com		**College**	cos	
Module Leader	Zahraa A. Abdalkareem		**e-mail**		
Module Leader's Acad. Title	Assist.Prof		**Module Leader's Qualification**	PhD	
Module Tutor	Name (if available)		**e-mail**	E-mail:zahraaadnan@imamaladhma.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	٠١/٠٨/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	٣
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 objectives of this course is to introduce software engineering and to provide a framework for understanding the rest of the book. When you have read this chapter you will: ■ understand what software engineering is and why it is important; ■ understand that the development of different types of software systems may require different software engineering techniques; ■ understand some ethical and professional issues that are important for software engineers;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. **Knowledge and Understanding:** **■ understand what software engineering is and why it is important;** **■ understand that the development of different types of software systems may require different software engineering techniques;** **■ understand some ethical and professional issues that are important for software engineers;** **■ have been introduced to three systems, of different types, that will be used as examples throughout the semster.** • **MLO ١:.** **٢. Cognitive/Intellectual Skills:** • **MLO ٤: Demonstrate a comprehensive understanding of the fundamental principles of software engineering methods & techniques** • **MLO ٥: A general introduction to software engineering by introduce important concepts such as software processes and agile methods, and describe essential software development activities, from initial software specification through to system evolution, this part have been designed to support a one-semester course in software engineering**. **٣. Practical/Professional Skills:** • **MLO ٧:** Develop and implement a software using a relevant programming language (e.g., Java, C++, Python) that adheres to industry standards and best practices. • **MLO ٨:** Apply techniques for debugging, testing, and maintaining . • **MLO ٩:** Work collaboratively in a team environment to design and develop a substantial software project, demonstrating effective communication and project management skills. **٤. Key Transferable Skills:** • **MLO ١٠:** Demonstrate problem-solving skills by breaking down complex problems into manageable components using software engineering techniques. • **MLO ١١:** Adapt to new and emerging technologies in software engineering methods, demonstrating lifelong learning and the ability to stay current with industry trends.

Indicative Contents المحتويات الإرشادية	The indicative content of software engineering course includes an introduction to core concepts like what are the software engineering techniques, why studying software engineering, What are the attributes of good software? What are the fundamental software engineering activities? How was doing Maintainability and testing for the software and the future direction of software development.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• Lectures • Tutorials • Problem solving • Case study • Small project

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

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ & ٨	LO #١, #٢ and #١٠, #١١
	Assignments	٢	٥٪ (٥)	٣ &٧	LO #٣, #٤ and #٦, #٧
	project	١	١٠٪ (١٠)		
			١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٢hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introduction to software engineering Software processes
Weeks ٢,٣	Agile software development, Requirements engineering
Weeks ٤,٥,٦	System modeling , Architectural design
Week ٧	Mid-term Exam
Weeks ٨,٩	Design and implementation,
Weeks ١٠ and ١١	Software testing
Weeks ١٢ and ١٣	Software evolution
Week ١٤	Project
Week ١٥	Final Exam
Week ١٦	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	- SOFTWARE ENGINEERING Ninth Edition Ian Sommerville	Yes
Recommended Texts	Software Engineering , A PRACTITIONER ' S APPROACH, Roger S. Pressman, Ph.D	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors

	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Numerical Methods**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**COM-٢١٥**				
ECTS Credits	**٥**				
SWL (hr/sem)	١٢٥				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	CS		**College**	Al-Imam Al-Adham University College	
Module Leader	Farook Nehad Abed		**e-mail**	farookalbadry@imamaladham.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	١٧/٠٩/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Computational mathematics**	**Semester**	١
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 main objectives of the course are to: ●Develop your skills how to apply numerical methods and techniques to solve problems in mathematics. ● Focus on error analysis and computational stability of algorithms.. ● Introduce the application of numerical methods to real-world engineering problems. ● Teach students in creating and evaluating their own numerical algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By completing the course, learners should be able to: ١. understand the basic ideas behind numerical techniques. ٢. Review the stability and accuracy of the numerical solutions. ٣. Implement numerical algorithms into practice within a programming framework. ٥. Apply numerical techniques to address real-world scientific
Indicative Contents المحتويات الإرشادية	١. Introduction to Numerical Methods and Error Analysis. ٢. Solutions of Nonlinear Equations. ٣. Optimization Techniques. ٤. Stability and Convergence of Algorithms. ٥. Numerical Linear Algebra. ٦. Interpolation and Curve Fitting. ٧. Numerical Solutions of Ordinary Differential Equations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures, Lab Tutorials, Practical Exercises, and Assignments

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٦٦	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤,٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٨	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,٢
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	٣	١٠٪ (١٠)	٢,٦ and ٩,١١	LO #٢, #٦ and #٩, #١١

assessment	**Assignments**	٢	١٠٪ (١٠)	٣,٥ and ١٠,١٢	LO #٣, #٥ and #١٠, #١٢
	Home Works	٢	١٠٪ (١٠)	٢,٥ and ٨,١١	LO #٢, #٥ and #٨, #١١
	Report	١	١٠٪ (١٠)	١٣	LO #١٣
	Projects / Lab.	٢	١٠٪ (١٠)	Continuous	All
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٨	LO #٨
	Final Exam	٢hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introduction to Numerical Methods * Definitions and classifications * Importance and applications * Overview of error analysis
Week ٢	Solutions of Nonlinear Equations * Bisection method * Newton-Raphson method * Secant method
Week ٣	Numerical Differentiation and Integration * Trapezoidal rule * Simpson's rule * Numerical differentiation formulas
Week ٤	Numerical Solutions of ODEs * Euler's method * Runge-Kutta methods * Stability of ODE solutions
Week ٥	Numerical Linear Algebra * Gaussian elimination * LU decomposition * Iterative methods
Week ٦	Interpolation * Lagrange interpolation * Newton's divided difference * Spline interpolation
Week ٧	Midterm Exam
Week ٨	Optimization Techniques * Unconstrained optimization * Constrained optimization * Applications in engineering
Week ٩	Stability and Convergence * Analysis of numerical algorithms * Convergence criteria * Practical examples
Week ١٠	

	Case Studies and Applications * Application of numerical methods in engineering * Discussion of case studies
Week ١١	Introduction to Numerical Methods * Definitions and classifications * Importance and applications * Overview of error analysis
Week ١٢	Solutions of Nonlinear Equations * Bisection method * Newton-Raphson method * Secant method
Week ١٣	Numerical Differentiation and Integration * Trapezoidal rule * Simpson's rule * Numerical differentiation formulas
Week ١٤	Numerical Solutions of ODEs * Euler's method * Runge-Kutta methods * Stability of ODE solutions
Week ١٥	Numerical Linear Algebra * Gaussian elimination * LU decomposition * Iterative methods

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Weeks ١ and ٢,٣	Introduction to Numerical Software * Overview of software tools used for numerical analysis * Setting up the environment * Basic operations
Weeks ٤ and ٥,٦	Nonlinear Equations * Implementing bisection method * Implementing Newton-Raphson method * Comparison of methods
Weeks ٧,٨ and ٩	Numerical Integration * Implementing trapezoidal and Simpson's rule * Numerical differentiation * Error analysis
Weeks ٩ and١٠ ,١١	Ordinary Differential Equations * Implementing Euler's method * Implementing Runge-Kutta methods * Solving real-world problems
Weeks ١٢,١٤ and ١٤	Linear Algebra * Implementing Gaussian elimination * LU decomposition * Solving systems of linear equations

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	● Burden, R. L., & Faires, J. D. (٢٠١١). Numerical Analysis (٩th Edition). Cengage Learning. ● Chapra, S. C., & Canale, R. P. (٢٠١٥). Numerical Methods for Engineers (Vth Edition). ●The Student Edition of Matlab ' The Language of Technical Computing' Version ٥ in ١٩٩٧.by Duane Hanselman .Prentice-Hall; Inc.	
Recommended Texts	● Sauer, T. (٢٠١٢). Numerical Analysis. Pearson. ● Atkinson, K. E. (١٩٨٩). An Introduction to Numerical Analysis (٢nd Edition). Wiley.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**حفظ القرآن الكريم (الجزء الثاني)**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	IMA- 205				
ECTS Credits					
SWL (hr/sem)					
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**		
Module Leader	م.م. محمد حميد مجد		**e-mail**	m.alsomaidy@imamaladham.edu.iq	
Module Leader's Acad. Title	مدرس مساعد		**Module Leader's Qualification**	ماجستير	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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	١. الإسهام في تحصين الطلبة فكرياً بعيداً عن الغلو والتطرف. ٢. فهم حقيقة الإسلام وأهمية التمسك به وتحكيمه في كل شؤون الحياة. ٣. الدعوة بين الناس، وشرح وتعليم الناس آيات القرآن الكريم بالطريقة الصحيحة. ٤. التقرب واللجوء إلى الله وملاقاته بحفظ القرآن الكريم، والحصول على الأجر والثواب. ٥. حفظ كتاب الله وتدبره والعمل بما فيه من أوامر واجتناب ما فيه من نواهي، وطلب ما فيه من هدى، وابتغاء ما فيه من رحمة وبركة، وأخذ ما فيه من بشارات وتحذيرات. ٦. تحقيق العبودية الخالصة لله والانقياد له في السر والعلن. ٧. تدريب الألسنة على الأسلوب القرآني واكتساب ثروة لغوية رفيعة القدر. ٨. توثيق الصلة الدائمة بكتاب الله والتدريب المستمر على حسن تلاوته وفهمه.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. ١. حفظ كتاب الله تعالى وتلاوته. ٢. الهداية إلى الله سبحانه وتعالى، الهداية الشاملة للطالب بكل كيانه ومشاعره وأحاسيسه وجوانب حياته، ومن بعد الطالب تتعدى هذه الهداية الى الهداية الشاملة للمجتمع بكل مجالاته وحياته والهداية الشاملة للإنسانية كلها إلى ربها سبحانه وتعالى. قال تعالى: {إِنَّ هَذَا الْقُرْآنَ يَهْدِي لِلَّتِي هِيَ أَقْوَمُ وَيُبَشِّرُ الْمُؤْمِنِينَ الَّذِينَ يَعْمَلُونَ الصَّالِحَاتِ أَنَّ لَهُمْ أَجْرًا كَبِيرًا(٩) } الإسراء . ٣. إيجاد الشخصية الإسلامية المتكاملة المتوازنة من الطالب، حيث يبدأ القرآن مع النفس البشرية بسهولة ويسر وتدرج، فيغرس الإيمان قي هذه النفس ويضيء لها جوانب حياتها بالنور الهادي وينمي فيها الخير والصلاح ويمدها بالوسائل والمناهج التي تعينها على رسالتها. ٤. إيجاد المجتمع الإنساني القرآني وهو المجتمع المكون من الأفراد القرآنيين الذين تربوا على منهج القرآن وأسسه ومبادئه وتوجيهاته. فعندما ينبثق الطلبة من نصوص القرآن ويعيشون في ظلال القرآن وينمون في جو القرآن ويتقلبون في أنوار القرآن يكون مجتمعاً حياً حياة عزيزة سعيدة. ٥. تحصين الطلبة من الانحراف نحو الأفكار الهدامة والتي تؤدي الى الغلو والتطرف وبناء الطالب على الفكر الوسطي المعتدل. ٦. التحلي والتخلق بأخلاق القرآن الكريم. ٧. صفاء الذهن . ٨. الطمأنينة والاستقرار النفسي. ٩. تطوير المدارك والقدرة على الاستيعاب والفهم. ١٠. التخلص من الخوف والحزن والقلق.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Sets • حفظ الجزء الثاني من سورة البقرة ويقسم حسب المحاضرات • الطريقة الجماعية • الطريقة الفردية • الطريقة الترديدية • الطريقة الجماعية الترديدية • رسوم توضيحية • مقاطع سماعية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١- إعطاء الواجبات البيتية لغرض التقوية والحفظ . ٢- القراءة الصوتية من قبل الأستاذ على الطلبة. ٣- اتباع طرق القراءة الأربعة وحسب ما يراه الاستاذ (الجماعية والفردية والترديدية والجماعية الترديدية). ٤- الاستماء الى المقاطع الصوتية المعدة من قبل الاستاذ

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and ١١	
	واجبات بيتية	10	10% (10)	مستمر	
	المشاركات في الصف	1	10% (10)	مستمر	
	Projects / Lab.				
	Report	1	10% (10)	13	عن أي محاضرة من المحاضرات
Summative assessment	**Midterm Exam**	2hr	10% (١٠)	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	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٤٢) إلى الآية رقم (١٤٥)
Week 2	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٤٦) إلى الآية رقم (١٥٣)
Week 3	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٥٤) إلى الآية رقم (١٦٣)
Week 4	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٦٤) إلى الآية رقم (١٦٩)
Week 5	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٧٠) إلى الآية رقم (١٧٦)
Week 6	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٧٧) إلى الآية رقم (١٨١)
Week 7	(حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٨٢) إلى الآية رقم (١٩٠
Week 8	اختبار نصف الفصل
Week 9	حفظ الجزء الثاني من سورة البقرة من الآية رقم (١٩١) إلى الآية رقم (٢٠٢)
Week 10	حفظ الجزء الثاني من سورة البقرة من الآية رقم (٢٠٣) إلى الآية رقم (٢١٥)
Week 11	حفظ الجزء الثاني من سورة البقرة من الآية رقم (٢١٦) إلى الآية رقم (٢٢٤)
Week 12	حفظ الجزء الثاني من سورة البقرة من الآية رقم (٢٢٥) إلى الآية رقم (٢٣٣)
Week 13	حفظ الجزء الثاني من سورة البقرة من الآية رقم (٢٣٤) إلى الآية رقم (٢٤٥)
Week 14	حفظ الجزء الثاني من سورة البقرة من الآية رقم (٢٤٦) إلى الآية رقم (٢٥٢)
Week 15	اختبار واستماع
Week 16	

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

Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	القرآن الكريم	Yes
Recommended Texts	١- تفسير القرآن الكريم (محد علي الصابوني)	
Websites	- https://youtu.be/fpXW6nZC7WE?si=iclZ33RViuNPIYeH	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	Supportive			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMA-٢٠٢**				
ECTS Credits					
SWL (hr/sem)					
Module Level	١		**Semester of Delivery**	١	
Administering Department			**College**		
Module Leader	م.م. محمد حميد محمد		**e-mail**	m.alsomaidy@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Teacher		**Module Leader's Qualification**	Masters	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMA-١٠٢	**Semester**	١
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. **الحفاظ على سلامة اللغة العربية وتقوية القدرة اللغوية لدى الطلاب واكسابهم مهارة التعبير الصحيح .** ٢. **تقوية ملكة الطلاب الأدبية لتذوق أساليب اللغة وإدراك مواطن الجمال فيها** ٣. **تنمية قدرات الطلاب ومهاراتهم الخطية والإملائية بحيث يستطيعون الكتابة الصحيحة مع ضرورة استعمال علامات الترقيم .** ٤. **تدريب الطلاب على استخدام القواعد النحوية والصرفية أثناء القراءة والكتابة والتعبير .** ٥. **تنمية الثروة اللغوية للطلاب وتزويدهم بكثير من الألفاظ والتراكيب بفضل ما يعرض عليهم من أمثلة وأساليب .**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **تمكين الطالب من القراءة الصحيحة وان يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً.** • **اعتياد التكلم باللغة العربية يؤثر على العقل والخلق والدين.** • **تطوير مهارات الطلاب في الاستماع والقراءة والتعبير.**
Indicative Contents المحتويات الإرشادية	١. **التوضيح من خلال الرسوم.** ٢. **التوضيح من خلال البوربوينت** ٣. **التوضيح من خلال حل التمارين** ٤. **التوضيح من خلال مشاركة الطلبة.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الاستراتيجية الرئيسية التي سيتم اعتمادها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين، وفي الوقت نفسه تحسين وتوسيع مهارات التفكير لديهم وسيتم تحقيق ذلك من خلال الفصل الدراسي والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض الأنشطة التي تهم الطلاب من خلال السؤال والمناقشة والحوار مع التطبيق.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Homework	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	• علامات الترقيم والتنقيط المتعلقة بالحاسوب
Week ٢	• بعض القواعد الاملائية • الجملة الاسمية والجملة الفعلية
Week ٣	• المبتدأ والخبر • أنواع الخبر
Week ٤	• كان وأخواتها
Week ٥	• إنّ وأخواتها
Week ٦	• الفاعل
Week ٧	• المفعول به
Week ٨	• امتحان نصف الفصل
Week ٩	• المفعول المطلق
Week ١٠	• المفعول فيه
Week ١١	• المفعول له
Week ١٢	• الحال
Week ١٣	• العدد
Week ١٤	• القصة والبناء القصصي في سورة يوسف
Week ١٥	• القصة والبناء القصصي في قصيدة غرباء لنازك الملائكة

Week ١٦	• إمتحان نهاية الكورس

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	
Week ٢	
Week ٣	
Week ٤	
Week ٥	
Week ٦	
Week ٧	
Week ٨	
Week ٩	
Week ١٠	
Week ١١	
Week ١٢	
Week ١٣	
Week ١٤	
Week ١٥	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	١. شرح ابن عقيل على ألفية ابن مالك / ابن عقيل، عبد الله بن عبد الرحمن العقيلي الهمداني المصري (ت: ٧٦٩هـ)، تحقيق: محمد محيي الدين عبد الحميد، دار التراث ـ القاهرة، دار مصر للطباعة، سعيد جودة السحار وشركاه، ط٢٠، ١٤٠٠ هـ ـ ١٩٨٠ م.	yes

	٢. القواعد الأساسية للغة العربية / للسيد أحمد الهاشمي , قدم له وضبط نصه الدكتور محمد التونجي , مؤسسة المعارف للطباعة والنشر – بيروت , ط٤ ١٤٣٣هـ٢٠١٢م ٠ ٣. محاضرات في البحث والتحقيق / للدكتور سليم حسين طالب ٠ ٤. البحر المحيط في التفسير / أبو حيان محمد بن يوسف بن علي بن يوسف بن حيان أثير الدين الأندلسي (ت: ٧٤٥هـ)، تحقيق: صدقي محمد جميل، دار الفكر – بيروت، ١٤٢٠ هـ. ٥. الفن القصصى فى القرآن الكريم د/ محمد أحمد خلف الله – مكتبة الأنجلو المصرية.	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Architecture**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢٢٣**				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	IMA	
Module Leader	KHALID IBRAHIM MOHAMMED Zaineb Riyadh Khalil		**e-mail**	k.ibrahimm@imamaladham.edu.iq zainebalani٨١@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D. M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	١٣/٠١/٢٠٢٥		**Version Number**	١,٠	

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	١. Introduction to the basic roles and responsibilities for each of the major hardware components of a computer. ٢. Review the need to use a memory hierarchy, perform memory management, and to explain to them the various memory management techniques and their tradeoffs. ٣. Describe the structure, function, and purpose of the computer for presentation as clearly and completely as possible
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- Have a clear understanding of the computer terminology. ٢- Have knowledge of Computer architecture and Hardware specifications. ٣- Have knowledge of different types of commuters and techniques. ٤- Review the need to use a memory hierarchy, perform memory management, and to explain to them the various memory management techniques and their tradeoffs. ٥- Prepare and deliver coherent and structured verbal and written technical reports. ٦. Review operation of hardware and software working synergistically together.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Introduction to Organization & Architecture Introduction to Computer, Basic Concepts, Computer Function and Structure [٥ hrs] Von neuman machine, Flynn computer architecture classification [٥ hrs] Computer memory system [٥ hrs] SRAM & DRAM [٣ hrs] RAM design and ROMs [٥ hrs] Cache memory principles and structure [٥ hrs]. Part B - ٨٠٨٦ Instruction set: Microprocessor Programming Interleaved memory [٥ hrs] Address interleaving and performance model; Virtual Memory Concept [٥ hrs] Paging and Segmentation mechanism [٥ hrs] CPU (Register, Hardware, Micro programmed and I/O) Organization [٣ hrs] Programmed and interrupt I/O [٣ hrs] introduction to parallel processing (SISD, SIMD, MISD, MIMD) [٤ hrs] pipeline structure [٣ hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Provides comprehensive converge of computer architecture including memory, CPU, I/O and parallel system.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٣٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٣
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٥٢	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٠٠		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introduction to Computer, Basic Concepts
Week ٢	Computer Function and Structure

Week ٣	Von neuman machine
Week ٤	Flynn computer architecture classification
Week ٥	Computer memory system
Week ٦	Cache memory principles and structure
Week ٧	**Midterm Exam**
Week ٨	Interleaved memory
Week ٩	Address interleaving and performance model
Week ١٠	Virtual Memory Concept
Week ١١	Paging and Segmentation mechanism
Week ١٢	CPU (Register, Hardware, Micro programmed and I/O) Organization
Week ١٣	Programmed and interrupt I/O
Week ١٤	introduction to parallel processing (SISD, SIMD, MISD, MIMD)
Week ١٥	pipeline structure
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	William stalling, Computer organization & architecture,٢٠٠٣	Yes
Recommended Texts	Daniel. A practical introduction to computer architecture. Springer Science & Business Media, ٢٠٠٩.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English language**			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	IMA-١٠٣				
ECTS Credits	٢				
SWL (hr/sem)	٤١				
Module Level	٢		**Semester of Delivery**	٢	
Administering Department	CS		**College**	Al-Imam Al-Adham University College	
Module Leader	Farook Nehad Abed		**e-mail**	farookalbadry@imamaladham.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	١٩/٠١/٢٠٢٥		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	٢
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• Teaching students to improve their understanding of the English language and to relate the language to computer science concepts. • Develop listening and speaking skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Developing the student's ability to use the language in a comprehensive way. • Developing his ability to write scientifically, listen and speak. • Developing his ability to read with correct pronunciation.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures, Practical Exercises, and Assignments

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	١٧	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤,٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٣٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,٢
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٤١		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٣	١٠٪ (١٠)	٢,٦ and ٩,١١	LO #٢, #٦ and #٩, #١١
	Assignments	٢	١٠٪ (١٠)	٣,٥ and ١٠,١٢	LO #٣, #٥ and #١٠, #١٢
	Home Works	٢	١٠٪ (١٠)	٢,٥ and ٨,١١	LO #٢, #٥ and #٨, #١١
	Report	١	١٠٪ (١٠)	١٣	LO #١٣
Summative	**Midterm Exam**	٢hr	١٠٪ (١٠)	٨	LO #٨

assessment	**Final Exam**	٢hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Tenses. Questions, writing informal letter
Week ٢	present tenses. Have/have got
Week ٣	past simple . past continuous have +noun
Week ٤	Count and uncount nouns. Expressions of quantity articles. Writing forms
Week ٥	verb patterns. Future forms . writing a postcard.
Week ٦	writing – describing a place
Week ٧	Midterm Exam
Week ٨	Present perfect.
Week ٩	writing a biography.
Week ١٠	writing a formal letter
Week ١١	Have (got) to
Week ١٢	**conditional clauses. Time clauses preposition+ word writing**
Week ١٣	verb patterns. Used to infinitives..
Week ١٤	formal and informal letters..
Week ١٥	Present perfect.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	New headway English course by liz and john soars	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Graphics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢٢٢**				
ECTS Credits	٥				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	١	
Administering Department	com		**College**	Alimam Aladham university college	
Module Leader	م.د. همام خالد ياسين م.د. محمد عدنان محمد		**e-mail**	humam.khalid@imamaladham.edu.iq mohammed.adnan@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Humam Khalid Yaseen Mohammed Adnan Mohammed		**e-mail**	humam.khalid@imamaladham.edu.iq mohammed.adnan@imamaladham.edu.iq	
Peer Reviewer Name	Humam Khalid yaseen Mohammed Adnan Mohammed		**e-mail**	humam.khalid@imamaladham.edu.iq mohammed.adnan@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	١
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١-Highlight the student to known between contours computer and graphic computer, recognize the mathematical basics and algorithms applied in the computer. ٢-Design software tools that it help computer graphics apply its and build a simple one that Simulate Computer graphic application, and addition that help to explain the cases in this aspect.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge to the introduction of computer graphics and applications and also Known the principle of the Vectors, we can plot basic geometric shapes with forms design and Transformation figure (moving shapes and rotation and scaled and shearing figure). Knowledge of clipping operations within the display window and Mapping operation. Then go to ٣D system and know the deal in the previous cases of Transformation with how ways representation ٣D in the computer and plot it into the computer and represent its. And other subject is a curve spline such as: Bezier-Spline, B-Spline, Cubic-Spline.
Indicative Contents المحتويات الإرشادية	١. **Introduction to computer graphics:** Cathode Ray Tube (CRT),Generating color on a RGB monitors, Coordinates system, Raster–can display, Frame Buffer, Scan conversion, Applications of computer graphics ٢. **Vectors**: unit vector, measurement associated with vectors, manipulation vectors, negative vectors and subtracting vectors, scaling Vectors, multiplying vectors uses the "dot Product" & direction Cosine **٣. Lines:** Standard line +DDA+ Bresenham, Rotation **٤. Matrix** **٥. ٣D shapes** ٦. **Project Work:** • Hands-on projects that involve computer graphics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١. **Start with Fundamentals:** Begin by introducing the fundamental concepts of computer graphicd. Ensure that students have a strong foundation in these basics before moving on to more complex topics. ٢. **Interactive Lectures:** Use engaging and interactive lectures that involve real-life examples and practical applications of computer graphics. Encourage student participation and questions

	Hands-on Labs: Provide opportunities for students to graph in a laboratory setting. Hands-on experience is invaluable in understanding how graphics on computer looks like **Group Work:** Encourage collaborative group projects where students work together to graph on computer. Group work can stimulate discussion and problem-solving. **Learning strategy:-** ١. **Active Learning:** Engage actively with the subject matter. Solve problems, practice on graphics. ٢. **Regular Practice:** Regularly practice solving graphics problems, to reinforce learning. ٣. **Self-Assessment:** Use self-assessment tools like quizzes, practice exams, and online resources to gauge your understanding and identify areas that need improvement. ٤. **Collaboration:** Collaborate with peers through study groups or project teams. Explaining concepts to others can solidify your own understanding. ٥. **Ask Questions:** Don't hesitate to ask questions during lectures or seek clarification from your instructor or peers. Computer graphics can be challenging, and asking questions is a vital learning strategy. ٦. **Work on Projects:** If your course includes practical projects, take them seriously. Applying what you've learned to real-world projects can deepen your understanding.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٢	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	١
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٦	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٤
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	Midterm Exam	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week ١	Introduction{Computer Graphics, Cathode Ray Tube (CRT),Generating color on a RGB monitors, Coordinates system, Raster–can display, Frame Buffer, Scan conversion, Applications of computer graphics }
Week ٢	Vectors {unit vector, measurement associated with vectors, manipulation vectors, negative vectors and subtracting vectors, scaling Vectors, multiplying vectors uses the "dot Product" & direction Cosine, "cross product" }
Week ٣	Draw Line {Standard line +DDA+ Bresenham }
Week ٤	Rotation around the main axes as well as rotation on the random axis
Week ٥	Matrix - Transformation٣D.
Week ٦	Parallel (orthogonal) projection + perspective projection .
Week ٧	oblique projection
Week ٨	Mid Exam
Week ٩	Spline Curve (Beazer curve +B-spline)
Week ١٠	Cubic interpolation
Week ١١	٣D shapes (helix, sphere, and ٣D line).
Week ١٢	Finding the normal vector of a plane and finding the equation of surfaces.
Week ١٣	Examination and detection of points belonging to the surface or not.
Week ١٤	Detect visible and hidden surfaces in ٣D
Week ١٥	Generate shadows on ٣ planes + build maps between Window & viewport.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	٣D vectors
Week ٢	٣D graphic representation
Week ٣	٣D graphic representation
Week ٤	Rotation around the main axes as well as rotation on the random axis
Week ٥	Matrix - Transformation٣D.
Week ٦	Parallel (orthogonal) projection + perspective projection
Week ٧	oblique projection
Week ٨	Mid Exam
Week ٩	Spline Curve (Beazer curve +B-spline)
Week ١٠	Cubic interpolation
Week ١١	٣D shapes (helix, sphere, and ٣D line).
Week ١٢	Finding the normal vector of a plane and finding the equation of surfaces.
Week ١٣	Examination and detection of points belonging to the surface or not.
Week ١٤	Detect visible and hidden surfaces in ٣D
Week ١٥	Generate shadows on ٣ planes + build maps between Window & viewport.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• computer graphics mathematics first step, P. A. Egerto and W. S. Hall, ١٩٩٨. • Visual Basic game Programming for teens, Jonathan S. Harboor, ٢٠٠٥ Riškus, "Approximation of a Cubic Bézier Curve by Circular Arcs and Vice Versa", Information Technology and Control, ٢٠٠٦ • Juhász, "Approximating the helix with rational cubic Bézier curves" Computer-Aided Design, ١٩٩٥.	Yes
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Object-Oriented Program II			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	COM-٢٢٥				
ECTS Credits	٥				
SWL (hr/sem)	١٢٥				
Module Level	٢		**Semester of Delivery**	٢	
Administering Department	com		**College**	IMA	
Module Leader	Zaineb Riyadh Khalil		**e-mail**	Zainebalani٨١@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	٠١/١٥/٢٠٢٥		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-٢١١	**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	١. Introduce the principles of object-oriented programming in a higher-level programming language in c++. ٢. Analyze a problem statement to develop a mental model of objects necessary to create a software architecture ٣. Utilize object-oriented programming to frame software architectures, with care towards separation of concerns and abstraction ٤. Gain skills in designing, and programming software for reuse of code. ٥. Establish development methods in object-oriented programming to qualify students for teaching the language in other settings
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain the motivation for and development of object-oriented programming languages. • Produce a set of use cases given a problem statement. • Produce class diagrams, object interaction diagrams and object state transition diagrams for a given problem. • Describe the essential features of an object-oriented programming language. • Produce and/or debug code fragments that illustrate principles of object-oriented software development. • Describe the principles for testing object-oriented software and derive sets of test data given a specification.
Indicative Contents المحتويات الإرشادية	✓ Structured programming ✓ Procedural programming ✓ Abstract data types (ADTs) ✓ Type of variable and range of applicable operations ✓ Use of classes in object-oriented programming ✓ How coupling and cohesion are implemented in OOP ✓ Abstraction and Encapsulation ✓ Data hiding/information hiding ✓ Classes and objects instances

Learning and Teaching Strategies اس رتاتيجيات التعلم والتعليم	
Strategies	There are different teaching and learning activities including lectures and laboratories. The concepts, process, and applications of data science will be discussed in lectures. Students will also learn computer programming knowledge and the skills of manipulating, processing, retrieving, storing, and plotting data. Students will develop small programs and learn different in laboratories.

Student Workload (SWL) الحمل الدرا يس للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	٦٣	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	٤
Unstructured SWL (h/sem) الحمل الدرا يس غ رت المنتظم للطالب خلال الفصل	٦٢	**Unstructured SWL (h/w)** الحمل الدرا يس غ رت المنتظم للطالب أسبوعيا	٣
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	١٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	١٠٪ (١٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبو يع النظري	
	Material Covered
Week ١	Overview of Object-Oriented Programming (OOP) principles. Class and object in OOP
Week ٢	Object as Function Arguments, Return Object from Function
Week ٣	Access specifiers: public, private, protected, Operator overloading
Week ٤	Local variable and class variable
Week ٥	Static and Constant Members (Object and Functions)
Week ٦	Constructors: default, parameterized, copy
Week ٧	Constructor overloading, and Destructor
Week ٨	Mid-term exam

Week ٩	Inheritance (definition, Derived and Base class), Constructor Inheritance, protected specifier
Week ١٠	Override Member Functions
Week ١١	Friend Functions and Friend Class
Week ١٢	The **This** Pointer
Week ١٣	Dynamic memory allocation (new/delete in C++)
Week ١٤	Virtual Functions
Week ١٥	Preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبو يع للمخت.ت	
	Material Covered
Week ١	Lab ١:Implement class with all members are public in C++
Week ٢	Lab ٢: Define a `Person` class with basic attributes (name, age) and methods. write code for
Week ٣	Lab ٣: Write a program to manage student records with class `Students using private members`
Week ٤	Lab ٤: overload function
Week ٥	Lab٥: Implement Static and non-static method.
Week ٦	Lab٦: Implement constructor of type copy
Week ٧	Lab ٧: Create a program demonstrating constructors and destructors in a Bookclass.
Week ٨	Lab ٨: Mid-term exam
Week ٩	Lab ٩: Create a program demonstrating inheritance
Week ١٠	Lab ١٠: implement Override Member Functions
Week ١١	Lab ١١: implement Friend Functions and Friend Class
Week ١٢	Lab ١٢: Create a program demonstrating The **This** Pointer
Week ١٣	Lab ١٣: Implement the **new** and **Delete** operator with objects
Week ١٤	Lab ١٤: implement Virtual Functions
Week ١٥	Prepare for final exam exercises

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Object-oriented programming with C++ by E.Balagurusamy, ٢nd Edition, TMH.	Yes
Recommended Texts	١. Object Oriented Design by Rumbaugh (Pearson publication) ٢. Object-oriented programming in Turbo C++ By Robert Lafore, Galgotia Publication.	No
Websites	https://www.coursera.org	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Visual programming**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COM-٢٢٦**				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	IMA	
Module Leader	*Hiba Hadi fezea*		**e-mail**	hiba.hadi.fezea@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MA	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	١٨/٠١/٢٠٢٥		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-٢١١	**Semester**	٢
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• To develop VB applications with a graphic user interface • To use interface components • To display output using VB OptionPane output dialog boxes • To create vb Forms with Frame • To use event-driven programming • To implement vb database programming • This course is a continuation of vb. This course introduces computer programming using the vb programming language Emphasis is placed on event-driven programming methods, including creating and manipulating objects (see contents below). Course Objectives Lab manual, • lab notes and lab exercises are designed to achieve the lab objectives. • Students are expected to read the material as detailed in the text and complete the exercises in lab. • Students are responsible for all material covered in the class.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Students will be able to learn visual programming basics and its components. • Students should gain both a conceptual understanding of specification and GUI design issues and their implementation, and hands-on experience implementing an IDE; • Students should be comfortable using the VB application programming interface to learn about and then to successfully and appropriately use an already-written VB class; • Students should have obtained experience designing, implementing, testing, and debugging graphical user interfaces that respond to user events using VB • Students will be able to learnVB database programming.
Indicative Contents المحتويات الإرشادية	• manual, notes and exercises are designed to achieve the objectives. • Students are expected to read the material as detailed in the text and complete • the exercises in calass • Students are responsible for all material covered in the class.

Learning and Teaching Strategies استراتيجات التعلم والتعليم	
Strategies	١. Automata and Language Theory (٢ Weeks) Key Topics: Finite Automata: Introduce the concepts of Deterministic Finite Automata (DFA) and Non-deterministic Finite Automata (NFA). Discuss their equivalence and applications in recognizing regular languages. Regular Expressions: Teach how regular languages can be described using regular expressions and their equivalence to finite automata. Demonstrate the use of regular expressions in practical applications (e.g., text processing). Push-down Automata (PDA): Introduce PDAs and their relation to context-

	free languages. Discuss the additional power PDAs provide over finite automata. Context-Free Grammars (CFGs): Define CFGs and show their relation to push-down automata. Discuss parsing and language generation. Pumping Lemmas: Teach the pumping lemma for regular languages and context-free languages. Use it to prove that certain languages are not regular or not context-free. Suggested Activities: Problem sets on designing automata and CFGs. Exercises on proving language properties using pumping lemmas. ٢. Computability Theory (٣ Weeks) Key Topics: Turing Machines: Introduce the model of a Turing machine (TM). Discuss its importance in defining computability. Show examples of simple Turing machines. The Church-Turing Thesis: Explain the thesis and its implications regarding the limits of computability. Decidability: Define decidability and introduce decidable and undecidable problems. Discuss examples such as the membership problem for context-free languages. The Halting Problem: Teach the classic proof of the undecidability of the halting problem. Discuss its consequences. Reducibility: Introduce reducibility (e.g., many-one reductions) as a technique for proving undecidability of other problems. The Recursion Theorem: Teach the recursion theorem and its implications in computability. Suggested Activities: Exercises on constructing Turing machines for different computational problems. Proving the undecidability of problems through reductions. ٣. Complexity Theory (٧ Weeks) Key Topics:

Time and Space Complexity: Introduce asymptotic notation and complexity measures (time and space). Discuss complexity classes like linear time, polynomial time, exponential time, etc.

Complexity Classes:

P, NP, NP-complete: Define class P (problems solvable in polynomial time), NP (problems verifiable in polynomial time), and NP-complete problems. Discuss the concept of polynomial-time reductions.

L and NL: Introduce space complexity classes such as L (logarithmic space) and NL (non-deterministic logarithmic space).

PSPACE: Discuss PSPACE, problems solvable in polynomial space, and PSPACE-complete problems.

BPP: Define probabilistic polynomial time and its relevance in randomized algorithms.

IP: Introduce interactive proof systems and the class IP. Explain the significance of results like IP = PSPACE.

Complete Problems: Study examples of NP-complete, PSPACE-complete, and other complete problems.

The P vs NP Problem: Present the P versus NP conjecture and its significance in theoretical computer science.

Quantifiers and Games: Discuss complexity classes using alternating quantifiers and how games can represent complex problems (e.g., two-player games).

Hierarchy Theorems: Explain the time and space hierarchy theorems, showing the existence of problems with increasing complexity.

Provably Hard Problems: Identify and study problems that are provably hard (e.g., EXP-complete problems).

Relativized Computation and Oracles: Introduce the idea of relativization and how it relates to separations of complexity classes.

Probabilistic Computation: Explore the role of randomness in computation.

Interactive Proof Systems: Discuss the theory behind interactive proofs and probabilistic verification.

Suggested Activities:

	Problem sets on proving complexity class membership. Practice with NP-completeness reductions. Discussions on the significance of P vs NP and possible breakthroughs. Suggested Resources: Textbooks: Introduction to the Theory of Computation by Michael Sipser. Computational Complexity: A Modern Approach by Sanjeev Arora and Boaz Barak. Online Tools: Use online simulators for DFA, NFA, PDA, and Turing machines to give students hands-on experience with abstract concepts.

Student Workload (SWL)

الحمل الدرا يس للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	٦٠	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	٣,٢
Unstructured SWL (h/sem) الحمل الدرا يس غ رت المنتظم للطالب خلال الفصل	٥٠	**Unstructured SWL (h/w)** الحمل الدرا يس غ رت المنتظم للطالب أسبوعيا	٣,٤
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	١٠٠		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.	١	١٠٪ (١٠)	Continuous	All
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introdution to Visual Basics (Visual Basics vs.Vb . NET ,Prerequisites، Microsoft Visual Studio & Visual Basic (.NET Version)
Week ٢	Getting Started with Visual studio
Week ٣	Writing software(identifiers,literals,varibles and constants
Week ٤	Variable Initialization,declaring. Declaring Enumerations, Type of Conversion Functions, Print and Display Constant The Operators,
Week ٥	Working with Controls(Designing the Form)
Week ٦	What is Controls
Week ٧	ListBox , Combo Box
Week ٨	Midterm Exam
Week ٩	Types of Statements (Declaration Statements , Executable Statements ,)
Week ١٠	Loop Statements(For-next statement ,)
Week ١١	Do. Loop Statement
Week ١٢	Decision Statements ,(If … Then … Else Statement , Nested IF), . Select Case Statement,
Week ١٣	Decision Statements If … Then … Else Statement, IIf ( ) Function
Week ١٤	Nested Loops
Week ١٥	Some of Important Functions & Properties & Methods
Week ١٦	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	**Introdution to Visual Basics**
Week ٢	**tools Control and Forms.**
Week ٣	**events and properties ,explorer Project**
Week ٤	**project –Microsoft vb ,make project, save it and its applications**
Week ٥	**exercises and projects Files**
Week ٦	**boxes message boxes Dialogue**
Week ٧	**Basic elements for visual basic statements, Variables, assignment statements.**
Week ٨	**Midterm Exam**
Week ٩	**General view on assignment statement, constants and operations .**
Week ١٠	**variable of astringe Adding**
Week ١١	**Control statements then…If and statements statement**
Week ١٢	**Select, For-next statement,**
Week ١٣	**loop Condition**
Week ١٤	**loop-Nested**
Week ١٥	**Seguences**
Week ١٦	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to vb Programming, Comprehensive version, Y. Daniel Liang, ٨th Edition	Yes
Recommended Texts		no
Websites	https://ocw.mit.edu/courses/١٨-٤٠٤j-vb Programming -fall-٢٠٢٠/pages/lecture- notes/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	جرائم نظام البعث في العراق			**Module Delivery**	
Module Type	S			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ImA-٢٠٤				
ECTS Credits	٢,٠٠				
SWL (hr/sem)	٥٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department			**College**		
Module Leader	ضياء جاسم محمد		**e-mail**	Dyaa.jasim@imamaladham	
Module Leader's Acad. Title	محاضر		**Module Leader's Qualification**	ماجستير	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	١٠/١/٢٠٢٥		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	None لا احد	**Semester**	
Co-requisites module	None لا احد	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Objectives أهداف المادة الدراسية	تهدف المادة الى تعريف وتوضيح الى الطلبة بالاحداث التي مر بها العراق في الحقبة التي تولى فيها نظام حزب البعث الحكم
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١-التعرف على الجرائم التي ارتكبها نظام حزب البعث والتوعية والتوضيح من مخاطر هذه الجرائم على المجتمع. ٢-توضيح الى الطلبة بابرز االانتهاكات التي ارتكبها نظام حزب البعث للقوانين العراقية ٣-توضيح مدى خطورة الجرائم النفسية واالجتماعية والبيئية التي ارتكبها هذا النظام على المجتمع ٤-اثبات االحداث التي مر بها العراق
Indicative Contents المحتويات الإرشادية	تتناول هذه المادة مفهوم الجرائم واقسامها والجرائم النفسية واالجتماعية والبيئية لنظام البعث

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	هناك العديد من االستراتيجيات التي يمكن استخدامها في تدريس وتعليم مادة جرائم نظام البعث في العراق في الجامعات. وفيما يلي بعض االستراتيجيات التعليمية المشتركة التي يمكن تطبيقها ١-المناقشات الجماعية: ٢-دراسة الحالة: ٣-العروض والمنشورات:

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ أسبوعا			
Structured SWL (h/sem)		**Structured SWL (h/w)**	

الحمل الدراسي المنتظم للطالب خالل الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خالل الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خالل الفصل	٥٠		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

المنهاج االسبوعي النظري

	Material Covered
Week ١	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥/مفهوم الجرائم وأقسامها
Week ٢	انواع الجرائم الدولية/القرارات الصادرة من المحكمة الجنائية العليا
Week ٣	الجرائم النفسية واالجتماعية
Week ٤	اليات الجرائم النفسية
Week ٥	أثار الجرائم النفسية، وأبرز انتهاكات النظام البعثي في العراق
Week ٦	الجرائم االجتماعية
Week ٧	عسكرة المجتمع
Week ٨	بعض قرارات االنتهاكات السياسية والعسكرية لنظام البعث
Week ٩	الجرائم البيئية لنظام البعث في العراق/التلوث الحربي واإلشعاعي وانفجار االلغام
Week ١٠	تدمير المدن والقرى سياسة أألارض المحروقة
Week ١١	تجفيف أألاهوار
Week ١٢	تجريف بساتين النخيل واألشجار والمزروعات
Week ١٣	جرائم المقابر الجماعية

Week ١٤	احداث مقابر الإبادة الجماعية المرتكبة من النظام البعثي في العراق
Week ١٥	التوقيت الزمني لمقابر الإبادة الجماعية في العراق
Week ١٦	مراجعة للمنهج قبل الامتحان النهائي

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مقرر دراسي للجامعات الحكومية والاهلية صادر عن وزارة التعليم العالي والبحث العلمي	لا
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	الاداء المتميز
	B - Very Good	جيد جدا	٨٠ - ٨٩	فوق المتوسط
	C - Good	جيد	٧٠ - ٧٩	عمل سليم مع وجود اخطاء ملحوظة
	D - Satisfactory	متوسط	٦٠ - ٦٩	عادل
	E - Sufficient	مقبول	٥٠ - ٥٩	العمل يلبي الحد الادنى من المعايير
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب قيد المعالجة	(٤٥-٤٩)	مطلوب المزيد من الجهد
	F – Fail	راسب	(٠-٤٤)	مطلوب المزيد من الجهد

ملاحظة: سيتم تقريب الاماكن العشرية للعلامات اعلى او اسفل الى العلامة الكاملة الاعلى او الادنى(على سبيل المثال سيتم تقريب العلامة٥٤,٥ الى٥٥ بينما سيتم تقريب العلامة ١ الى ١ لكون الجامعة تتبع سياسة عدم التسامح مع حالات الفشل في اجتياز الاختبار لذا فان التعديل الوحيدعلى الدرجات الممنوحة من قبل المصححين الاصليين سيكون التقريب التلقائي الموضح اعلاه.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to python**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **L Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢٢٤**				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	IMA	
Module Leader	*Raya mohammed mahmood*		**e-mail**	raya.mohammed@imamaladham.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	٠٤/٠١/٢٠٢٥		**Version Number**	١,٠	

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	By the end of this module, learners will be able to: ١- Understand Python and Its Applications. ٢- Understand Python Syntax and Structure with Variables, Data Types and Expressions. ٣- Implement Control Flow Structures, Data Structures and Functions. ٤- Perform Basic File and Exceptions Handling. ٥- Understand the Basics of Modules and Libraries. ٦- Apply Python in Real-World Scenarios.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- Describe Python and Its Uses ٢- Set Up and Use a Python Development Environment ٣- Demonstrate Understanding of Python Syntax and Structure ٤- Utilize Variables and Data Types Effectively ٥- Apply Operators and Expressions in Python ٦- Implement Control Flow Statements ٧- Use Data Structures for Storing and Manipulating Data ٨- Define and Use Functions ٩- Handle Errors and Exceptions ١٠- Perform File Handling Operations ١١- Utilize Modules and Libraries ١٢- Solve Simple Programming Problems Using Python ١٣- Develop small Python programs to automate tasks and process data. ١٤- Apply problem-solving techniques using Python programming constructs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. ١- Introduction to Python & Environment Setup ٢- Python Syntax and Basic Operations ٣- Operators and Expressions ٤- Control Flow – Conditional Statements ٥- Control Flow – Loops and Iterations ٦- Working with Strings and String Manipulation ٧- Lists, Tuples, and Sets ٨- Dictionaries and Data Structures ٩- Functions and Modular Programming ١٠- Exception Handling and Debugging ١١- File Handling in Python ١٢- Introduction to Object-Oriented Programming (OOP) ١٣- Introduction to Libraries and Modules ١٤- Real-World Python Applications & Mini Project

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The Introduction to Python module will adopt a learner-centered, hands-on approach to ensure engagement, skill acquisition, and practical application. The teaching strategy will incorporate various methods to enhance comprehension, retention, and problem-solving skills. These strategies includes: • Engaging – Interactive and hands-on approach. • Practical – Real-world projects for deeper understanding. • Collaborative – Encourages teamwork and peer learning. • Career-Oriented – Links Python to real-world applications.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٧٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٥,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,١
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٣	١٥٪ (١٥)	٤ ,٧,١٢	LO #١, #٢ ,#٣ LO #٤,#٥, #٦ and LO#٩,#١٠, #١١
	Assignments	١	٥٪ (٥)	٩	LO #٧, #٨
	Projects / Lab.	١	١٠٪ (١٠)	١٤	All
	Report				
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٨	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Introduction to Python • What is Python? • Installing Python and setting up the environment (IDLE, VS Code, Jupyter Notebook). • Writing and running your first Python program. • Python syntax and indentation. • Variables and data types (int, float, str, bool).
Week ٢	Input/Output and Basic Operators • Taking user input using input(). • Displaying output using print(). • Arithmetic operators (+, -, *, /, %, **). • Comparison operators (==, !=, >, <, >=, <=). • Logical operators (and, or, not).
Week ٣	Control Flow • Conditional statements (if, elif, else). • Nested conditions. • Loops (for, while). • Loop control statements (break, continue, pass).
Week ٤	Functions • Defining and calling functions. • Function arguments and return values. • Default arguments and keyword arguments. • Variable scope (local vs global).
Week ٥	Data Structures - Lists • Introduction to lists. • List operations (indexing, slicing, appending, removing). • List methods (append(), remove(), sort(), reverse()). • List comprehensions.
Week ٦	Data Structures - Tuples and Sets • Introduction to tuples (immutable sequences). • Tuple operations (indexing, slicing, unpacking). • Introduction to sets (unique elements). • Set operations (union, intersection, difference).
Week ٧	Data Structures - Dictionaries • Introduction to dictionaries (key-value pairs). • Dictionary operations (adding, updating, deleting). • Dictionary methods (keys(), values(), items()).

Week ٨	**Midterm Exam**
Week ٩	Strings and File Handling • String operations (concatenation, slicing, formatting). • String methods (split(), join(), replace(), strip()). • Reading from and writing to files.
Week ١٠	Error Handling and Debugging • Types of errors (syntax errors, runtime errors, logical errors). • Handling exceptions using try, except, finally. • Debugging techniques.
Week ١١	Modules and Packages • Importing modules (math, random, datetime). • Creating and using custom modules. • Installing and using third-party packages with pip
Week ١٢	Object-Oriented Programming (OOP) • Introduction to OOP (classes and objects). • Attributes and methods. • Constructors (__init__ method). • Inheritance and polymorphism.
Week ١٣	Working with Libraries • Introduction to popular Python libraries (numpy, pandas, matplotlib). • Data manipulation with pandas. • Data visualization with matplotlib.
Week ١٤	Introduction to Web Scraping • Basics of web scraping. • Using requests and BeautifulSoup libraries. • Extracting data from websites.
Week ١٥	Final Project and Review • Recap of all topics covered. • Guidelines for the final project. • Q&A session.
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	• Installing python • Write a program to print "Hello, World!". • Create variables and perform basic arithmetic operations.
Week ٢	• Write a program to calculate the area of a rectangle. • Create a simple calculator.

Week ٣	• Write a program to check if a number is even or odd. • Create a multiplication table using loops.
Week ٤	• Write a function to calculate the factorial of a number. • Create a function to check if a string is a palindrome.
Week ٥	• Write a program to find the largest number in a list. • Create a list of squares using list comprehension.
Week ٦	• Write a program to count the frequency of elements in a tuple. • Perform set operations on two sets.
Week ٧	• Write a program to create a phonebook using dictionaries. • Count the frequency of words in a text using a dictionary.
Week ٨	• Midterm exam
Week ٩	• Write a program to reverse a string. • Read a text file and count the number of lines. • Write a program to handle division by zero.
Week ١٠	• Debug a program with logical errors. • Write a program to generate random numbers. • Create a custom module for mathematical operations.
Week ١١	• Create a class to represent a bank account. • Implement inheritance with a base class Animal and derived classes Dog and Cat.
Week ١٢	• Perform basic data analysis using pandas. • Create a bar chart using matplotlib.
Week ١٣	• Write a program to scrape headlines from a news website.
Week ١٤	• Build a small application (e.g., a to-do list, a quiz game, or a weather app).
Week ١٥	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	"Introduction to Python" by Brian Gregor.	Yes
Recommended Texts	"Python Crash Course" by Eric Matthes. "Automate the Boring Stuff with Python" by Al Sweigart.	no
Websites	١. Online Platforms: ○ Python.org ○ Real Python ○ W٣Schools Python Tutorial ٢. Practice Platforms: ○ LeetCode ○ HackerRank	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Algorithms Design and Analysis**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-٢١٣**				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level	٢		**Semester of Delivery**	٣	
Administering Department	com		**College**	IMA	
Module Leader	*Bashar Ibrahim Hameed*		**e-mail**	bashar_ibrahim@imamaladham.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	٠٤/٠٩/٢٠٢٤		**Version Number**	١,٠	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-١٢٢	**Semester**	١
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. Enable the student to be able to identify, the best way to design and Analyze an algorithm. ٢. Study the basic types of algorithms to solve a group of known problems with their Practical application. ٣. Enable the student to know the Basic methods of how to analyze complexity of algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- Enable the student to Know and understand the theoretical ٢- Principles of algorithms and calculate their complexity. ٣- ٢. Enable the student to understand the correct analysis ٤- Methods for the complexity of algorithms. ٥- ٣. Enable the student to handle cases of high complexity to ٦- achieve optimization, ٧- ٤. Motivate the student to practically apply the algorithm and use ٨- it to solve a set of problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Concepts and properties of algorithms - Differences among best, expected, and worst case behaviors of an algorithm - Computing by calculating how programs are evaluated. - Rule of algorithms in problem solving process - Problem solving strategies, Iteration and recursive traversal of data structure, Modularity - implementation of algorithms - Algorithms strategy • ٤-color mapping • Traveling Salesman • Shortest Path • Brute force algorithm • Greedy algorithm • Divide and conquer • Recursive backtracking • Dynamic programming • Network flow • Branch and bound • heuristics • reduction : transform and conquer • Approximation Algorithms (Euclidian tour, Vertex cover, Knapsack). algorithms efficiency (e.g. operation count). - fundamental design concepts and principals • abstraction • decomposition • encapsulation

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٧٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٥,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,١
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	١٠٪ (١٠)	٥ and ١٠	LO #١, #٢ and #١٠, #١١
	Assignments	٢	١٠٪ (١٠)	٢ and ١٢	LO #٣, #٤ and #٦, #٧
	Projects / Lab.				
	Report	١	١٠٪ (١٠)	١٣	LO #٥, #٨ and #١٠
Summative assessment	**Midterm Exam**	٢hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All
Total assessment			١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Concepts and properties of algorithms
Week ٢	Differences among best, expected, and worst-case behaviors of an algorithm
Week ٣	Computing by calculating how programs are evaluated. ● Rule of algorithms in problem solving process
Week ٤	Problem solving strategies ●Iteration and recursive traversal of data structure ●Modularity
Week ٥	●implementation of algorithms ●Algorithms strategy ● ٤-color mapping
Week ٦	● Traveling Salesman ●Shortest Path
Week ٧	● Brute force algorithm ●Greedy algorithm
Week ٨	**Midterm Exam**
Week ٩	●Divide and conquer ●Recursive backtracking
Week ١٠	●Dynamic programming ●Network flow
Week ١١	●Branch and bound ●heuristics
Week ١٢	reduction : transform and conquer
Week ١٣	Approximation Algorithms (Euclidian tour, Vertex cover, Knapsack).
Week ١٤	algorithms efficiency (e.g. operation count).
Week ١٥	fundamental design concepts and principals • abstraction • decomposition • encapsulation
Week ١٦	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	What are data type in C++
Week ٢	pattern in C++
Week ٣	Solve any number pattern

Week ٤	Solve any number pattern
Week ٥	Solve any character pattern
Week ٦	Solve any character pattern
Week ٧	C++ lambda function
Week ٨	Python lambda function
Week ٩	recursive function
Week ١٠	recursive function
Week ١١	Greedy algorithm
Week ١٢	Greedy algorithm
Week ١٣	Divide and conquer algorithm
Week ١٤	Divide and conquer algorithm
Week ١٥	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Levitin, Anany. Introduction to the design & analysis of algorithms. Pearson Education India, ٢٠٠٧. ٣rd edition. • Horowitz, Ellis. Fundamentals of computer algorithms. Galgotia publications • Algorithm Design - John Kleinberg - Éva Tardos	Yes
Recommended Texts		no
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (٥٠ - ١٠٠)	**A -** Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings

	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX –** Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Compiler**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐**Practical** ☐ **Seminar**	
Module Code	**COM-311**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	**3**		**Semester of Delivery**	**5**	
Administering Department	com		**College**	IMA	
Module Leader	Mohammed Adnan Mohammed		**e-mail**	mohammed.adnan@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	أ.م.مصطفى محمد عكاوي		**e-mail**	mostafaakawi@imamaladham.edu.iq	
Peer Reviewer Name	*Bashar Ibrahim Hameed*		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-213	**Semester**	3
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-Introduce students to the basics of programming languages, rules and ways of expressing 2- Enable the student to build a complete system of translators after study and understand the key stages in detail
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the phases of compilation – Explain the structure and functions of lexical analysis, syntax analysis, semantic analysis, intermediate code generation, optimization, and code generation. 2- Design and implement lexical analyzers – Use regular expressions and finite automata to develop a lexical analyzer (scanner) for a given programming language. 3- Construct parsers using parsing techniques – Apply context-free grammars (CFGs) and implement top-down (e.g., recursive descent, LL parsing) and bottom-up (e.g., LR parsing) parsing techniques. 4- Perform semantic analysis and intermediate code generation – Develop attribute grammars, type checking, and syntax-directed translation schemes to generate intermediate representations (e.g., three-address code, abstract syntax trees). 5- Apply code optimization techniques – Analyze and optimize intermediate and target code using control flow graphs, data flow analysis, and optimization methods (e.g., constant folding, dead code elimination). 6- Generate target machine code – Understand and implement code generation for a target architecture, including register allocation and instruction selection
Indicative Contents المحتويات الإرشادية	Programming language, introduction to compiler, lexical analysis, symbol table, context free grammar, Finite automata, syntax analysis, parsing tree & leftmost and right most derivations, writing grammar, problems of grammar, Top down parsing, predictive parsing method, first and follow, construction of predictive parsing table, LL grammars, Error detection and reporting, Bottom up parsing, operator precedence parser.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	There are different teaching and learning activities including lectures and laboratories. It Focus on understanding the input and output of each stage such as scanning, parsing, semantic analysis, and code generation. Also utilize parser generators to ensure you learn the underlying concepts they automate visualizing abstract concepts like parse trees. As well as, Students will develop small programs in laboratories

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #5
	Assignments	2	10% (10)	4 and 12	LO #3, #4 and #6,
	Projects / Lab.	1	10% (10)	13	LO #5, #6
	Report	1	10% (10)	14	
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #4
	Final Exam	3hr	50% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Compiler
Week 2	Lexical analysis
Week 3	Syntax of Analysis,
Week 4	Problems of Compiler, ambiguity, left recursion, left factoring
Week 5	First and Follow
Week 6	Top down Parsing, Predictive Parsing Method
Week 7	Left to right-right most derivation (LL1) using parsing table
Week 8	Midterm Exam
Week 9	Bottom up LL(1),Parsing, Operation Precedence Parser

Week 10	Simple Left to Right Parser (SLR)
Week 11	Semantic Analysis, static semantic, dynamic semantic
Week 12	Intermediate Code Generation
Week 13	follow Code Optimization, code optimization types
Week 14	Code Generation
Week 15	Prepare to Final Exam
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to compiler
Week 2	Stack operations Write a program to perform input & output operations on lexcal analysis
Week 3	Stack operations Write a program to implement loop & if statement syntax of analysis
Week 4	Queue Operations Write a program to implement Arrays (introduction, types, looping, search, insert, delete).
Week 5	Write a program for functions, first & follow
Week 6	Write a program Operations Write a program to file
Week 7	Sorting and searching : Write a program to perform · left to right using(LLI) using parsing table
Week 8	Midterm Exam
Week 9	Sorting and searching : Write a program to perform · bottom up LL operation precedence parser
Week 10	Sorting and searching : Write a program to operations · simple left to right paeser (S LR)
Week 11	Write a program to operations · simple left to right
Week 12	operations Write a program to semantic analysis & static semantic &dynamic semantic
Week 13	Write a program to perform first intermediate code generation on compiler
Week 14	Write a program for functions, follow code optimization & code optimization types
Week 15	Prepare to Final Exam
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Principle of compiler design by Alfred V.Aho & Jeffrey D.Ullman	No
Recommended Texts	1. Compilers: principle, techniques and tools by Alfred V.Aho , Ravi Seth, Jeffrey D.Ullman 2. Basics of compiler design by Torben Egidius mogensen	No
Websites	https://dpvipracollege.ac.in/wp-content/uploads/2023/01/Alfred-V.-Aho-Monica-S.-Lam-Ravi-Sethi-Jeffrey-D.-Ullman-Compilers-Principles-Techniques-and-Tools-Pearson_Addison-Wesley-2007.pdf	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital image processing**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-314**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department			**College**	IMA	
Module Leader	م.د. همام خالد ياسين		**e-mail**	humam.khalid@imamaladham.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	م.م. طه بهاء خليل		**e-mail**	taha.bahaa@imamaladham.edu.iq	
Peer Reviewer Name	*Bashar Ibrahim Hameed*		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-222	**Semester**	4
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 course aims to enable the student to know the digital image processing methods stems from two principal application areas: improvement of pictorial information for human interpretation, and processing of image data for tasks such as storage, transmission, and extraction of pictorial information.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Have a clear understanding of the principals the Digital Image Processing terminology used to describe features of images. 2. Have a good understanding of the mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; compression and analysis. 3. Be able to write programs using Matlab language for digital manipulation of images; image acquisition; preprocessing; segmentation; and compression. 4. Have knowledge of the Digital Image Processing Systems. 5. Be able to understand the documentation for, and make use of, the MATLAB library and MATLAB Digital Image Processing Toolbox (IPT). 6. Learn and understand the Image Enhancement in the Spatial Domain. 7. Learn and understand the Image Enhancement in the Frequency Domain. 8. Understand the Image Restoration, Compression, Segmentation, Recognition, Representation and Description. 9. Be able to use different digital image processing algorithms. 10. Analyze a wide range of problems and provide solutions related to the design of image processing systems through suitable algorithms, structures, diagrams, and other appropriate methods.
Indicative Contents المحتويات الإرشادية	**1. Introduction to Digital image processing:** • Understand the concept of a digital image. • Be aware of the different fields in which digital image processing methods are applied. • Be familiar with the basic processes involved in image processing. • Be familiar with spatial and intensity resolution and their effects on image appearance. • Have an understanding of basic geometric relationships between image pixels. • Be familiar with the principal mathematical tools used in digital image processing. • Be able to apply a variety of introductory. **2. Intensity transformation and special filtering :** • Understand the meaning of spatial domain processing, and how it differs from transform domain processing. • Be familiar with the principal techniques used for intensity transformations. • Understand the physical meaning of image histograms and how they can be manipulated for image enhancement. • Understand the mechanics of spatial filtering, and how spatial filters are formed. • Understand the principles of spatial convolution and correlation. • Be familiar with the principal types of spatial filters, and how they are applied. • Be aware of the relationships between spatial filters, and the fundamental role of lowpass filters. **3. Filtering in the frequency domain:** • Understand the meaning of frequency domain filtering, and how it differs from filtering in the spatial domain. • Be familiar with the concepts of sampling, function reconstruction, and aliasing.

	• Understand convolution in the frequency domain, and how it is related to filtering. • Know how to obtain frequency domain filter functions from spatial kernels, and vice versa. • Be able to construct filter transfer functions directly in the frequency domain. • Understand why image padding is important. • Know the steps required to perform filtering in the frequency domain. • Understand when frequency domain filtering is superior to filtering in the spatial domain. • Be familiar with other filtering techniques in the frequency domain, such as unsharp masking and homomorphic filtering. **4. Image restoration and construction:** • Be familiar with the characteristics of various noise models used in image processing, and how to estimate from image data the parameters that define those models. • Be familiar with linear, nonlinear, and adaptive spatial filters used to restore (denoise) images that have been degraded only by noise. **5. Image segmentation:** • Understand the characteristics of various types of edges found in practice. • Understand how to use spatial filtering for edge detection. • Be familiar with other types of edge detection methods that go beyond spatial filtering. • Understand image thresholding using several different approaches.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Start with Fundamentals:** Begin by introducing the fundamental concepts of digital image processing. Ensure that students have a strong foundation in these basics before moving on to more complex topics. **2. Interactive Lectures:** Use engaging and interactive lectures that involve real-life examples and practical applications of digital image processing. Encourage student participation and questions **Hands-on Labs:** Provide opportunities for students to write and implement codes for digital image processing algorithms in a laboratory setting. Hands-on experience is invaluable in understanding how digital image processing works **Group Work:** Encourage collaborative group projects where students work together to write and implement codes. Group work can stimulate discussion and problem-solving. **Learning strategy:-** **1. Active Learning:** Engage actively with the subject matter. Understanding and solve problems, write and implement codes for digital image processing. **2. Regular Practice:** Regularly practice solving image processing problems to reinforce learning. **3. Self-Assessment:** Use self-assessment tools like quizzes, practice exams, and online resources to gauge your understanding and identify areas that need improvement. **4. Collaboration:** Collaborate with peers through study groups or project teams. Explaining concepts to others can solidify your own understanding.

	5. Ask Questions: Don't hesitate to ask questions during lectures or seek clarification from your instructor or peers. Image processing can be challenging, and asking questions is a vital learning strategy. **6. Work on Projects:** If your course includes practical projects, take them seriously. Applying what you've learned to real-world projects can deepen your understanding.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.0
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 #9, #10
	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% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Digital Image Processing Image Formation Color Models (RGB, HSV, Grayscale)
Week 2	Image Sampling & Quantization Pixel Relationships & Histograms

Week 3	Intensity Transformations (Log, Power-Law, Thresholding)
Week 4	Spatial Domain Processing Smoothing Filters: Mean, Median, Gaussian
Week 5	Sharpening Filters: Laplacian, Unsharp Masking
Week 6	Noise Models (Gaussian, Salt & Pepper)
Week 7	Feature Detection Edge Detection: Sobel, Prewitt, Canny
Week 8	Midterm
Week 9	Hough Transform: Line/Circle Detection
Week 10	Corner Detection: Harris
Week 11	Image compression
Week 12	Image Segmentation Thresholding (Otsu's Method) Region-Based (Watershed)
Week 13	Feature Descriptors: SIFT, SURF
Week 14	Texture Analysis: Gabor Filters
Week 15	Prepare to final exam
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Digital Image Processing Lab
Week 2	Pixel Relationships and Histograms Lab
Week 3	Intensity Transformations Lab (Log, Power-Law, Thresholding)
Week 4	Spatial Domain Processing Lab (Smoothing Filters: Mean, Median, Gaussian)
Week 5	Sharpening Filters Lab (Laplacian, Unsharp Masking)
Week 6	Noise Models and Filtering Lab (Gaussian, Salt & Pepper)
Week 7	Edge Detection Techniques Lab (Sobel, Prewitt, Canny)
Week 8	Midterm Exam
Week 9	Hough Transform for Line/Circle Detection Lab
Week 10	Harris Corner Detection Lab
Week 11	Image compression Lab
Week 12	Image Segmentation Lab (Otsu's Thresholding, Watershed)
Week 13	Feature Descriptors Lab (SIFT, SURF)
Week 14	Texture Analysis Lab (Gabor Filters)
Week 15	Prepare to final exam
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital Image Processing, FOURTH EDITION Rafael C. Gonzalez • Richard E. Woods	No
Recommended Texts	Digital Image Processing Huiyu Zhou, Jiahua Wu, Jianguo Zhang	No
Websites	https://elibrary.pearson.de/book/99.150005/9781292223070	

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)	A considerable amount of work is required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Database**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-315**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	COM		**College**	IMA	
Module Leader	Dr. Raya Mohammed Mahmood		**e-mail**	raya.mohammed@imamaladham.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	PhD	
Module Tutor	Mustafa Ahmed Muhi		**e-mail**	Mustafa.ahmed@imamaladham.edu.iq	
Peer Reviewer Name	*Bashar Ibrahim Hameed*		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Gain knowledge of fundamental concepts of database systems and its importance in modern applications. 2. Empower student's ability to design conceptual and relational models of database using modeling methods (ER/EER/UML). 3. Acquisition of practical skills in using structured query language to create, manage and querying data. 4. Explain the mechanism of storing data, indexing, query handling and improvement. 5. Introduction parameters mechanism, transactions, concurrency and retrieval. 6. Empower student ability to deal with multiple database techniques such as distributed database, XML, datamining.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the fundamental concepts of database systems and the content of database management systems. 2. Data requirement analysis and database schema design using (ER/EER/UML). 3. Apply normalization rules to ensure design quality. 4. Writing an advanced SQL queries and manage database. 5. Understand the internal structure of storing, indexing, and query handling mechanism. 6. Explain parameters fundamentals, transactions, concurrency and information retrieval. 7. Introduced to modern technology such as distributed DB, XML, and datamining. 8. The ability to design and execute full database project.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to database systems and types. 2. Database management system structure. 3. Entity relationship diagram (ER) and relational model. 4. Transferring entity relationship to relational model. 5. Normalization rules (1NF, 2NF, 3NF, BCNF, 4NF, 5NF). 6. SQL (defining schemas, constraints, records, queries, parameters, transactions, views). 7. Physical storage, indexing (B-Tree, Hashing, Multilevel Indexes). 8. Query processing and improvement. 9. Transaction, concurrency and retrieval. 10. Distributed DB, XML, and datamining.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	· At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. · Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. · Attendance is compulsory in lecture which carries 10 marks in overall evaluation. · One internal exam will be conducted as a part of internal theory evaluation. · Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation. · Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation. · The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. · Experiments shall be performed in the laboratory related to course contents.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10% (10)	3,6,9,12	LO #1-#3, LO #3-#6, LO #6-#7
	Assignments	1	10% (10)	13	LO #3, #4 and #8
	Projects / Lab.	2	10% (10)	Continuous	All
	Home Works	2	10% (10)	4,7	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	All
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Db systems, components and evolution.
Week 2	Entity relationship diagram (ER Model).
Week 3	Enhanced entity–relationship (EER) و UML.
Week 4	Transferring from ER/EER to relational model.
Week 5	Relational model: tables , keys, constraints
Week 6	Normalization (1NF – BCNF).
Week 7	SQL– definition, tables, simple query.
Week 8	Mid-term exam
Week 9	Advanced SQL and views.
Week 10	indexing and physical data storing
Week 11	Query processing and enhancement.
Week 12	Concurrency and transaction setting.
Week 13	Retrieval mechanism
Week 14	Distributed DB
Week 15	Prepare to final exam
Week 16	final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to DBMS such as (Ms Access- MySQL – SQL server).
Week 2	Simple ER diagram project.
Week 3	Transferring the ER to tables.
Week 4	Simple query and data entry.
Week 5	Trying advanced SQL query.
Week 6	Apply normalization on specific tables.
Week 7	Creating indices and performance analysis.
Week 8	Mid term exam
Week 9	Execute transaction in SQL.
Week 10	Execute information retrieval.

Week 11	Using views and stored procedures.
Week 12	Design simple distributed DB.
Week 13	Dealing with XML in DB.
Week 14	Report project discussion.
Week 15	Prepare to final exam
Week 16	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Hector Garcia-Molina, Jeffery D. Ullman, Jennifer Wisdom, database system the complete, 2nd Ed. 2- Ramez Emasry, Shamkant B. Navathe, Fundamental of Databalmasryse Systems , 4nd Edition	no
Recommended Texts		no
Websites	https://www.tutorialspoint.com https://www.geeksforgeeks.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Research Methodology**			**Module Delivery**	
Module Type	**E**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-316**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		3	**Semester of Delivery**		5
Administering Department		COM	**College**		IMA
Module Leader	Farook Nehad Abed		**e-mail**		farookalbadry@imamaladham.edu.iq
Module Leader's Acad. Title		Assist. Prof	**Module Leader's Qualification**		Ph.D
Module Tutor			**e-mail**		
Peer Reviewer Name		Bashar Ibrahim Hameed	**e-mail**		bashar_ibrahim@imamaladham.edu.iq
Scientific Committee Approval Date			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	By the end of this course, students will be able to: 1. Understand the foundations of scientific research and its role in computer science. 2. Identify and formulate research problems. 3. Conduct effective literature reviews using academic sources. 4. Apply qualitative and quantitative research methods. 5. Use appropriate tools for data collection and analysis. 6. Write research papers and reports according to academic standards. 7. Develop and present research proposals. 8. Apply ethical considerations in research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion, students should be able to: •Demonstrate understanding of research methodologies. •Critically analyze and evaluate existing research. •Design and plan small-scale research projects. •Communicate research findings effectively through writing and oral presentations.
Indicative Contents المحتويات الإرشادية	This course introduces students to the principles and practices of scientific research in computer science. It provides knowledge and skills related to research design, data collection, data analysis, academic writing, and presentation of research findings. Students will learn how to formulate research problems, conduct literature reviews, apply qualitative and quantitative methods, and develop research proposals.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy adopted for delivering this module is to encourage students' participation in lectures while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and assignments.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	68	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.1
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)	6 and 9	LO #1, #2 and #3, #4
	Assignments	2	10% (10)	5 and 10	LO #1and #4
	Home Works	4	10% (10)	2,5 and 8,11	LO #1, #2 and #3, #4
	Report	1	10% (10)	11	LO #4
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1, #2 and #3, #4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Research: Definition, Objectives, and Importance in Computer Science
Week 2	Types of Research: Basic vs. Applied, Qualitative vs. Quantitative
Week 3	Research Process and Research Design
Week 4	Identifying Research Problems and Questions
Week 5	Literature Review: Searching, Evaluating, and Synthesizing Sources
Week 6	Research Ethics and Academic Integrity (Plagiarism, Citation)
Week 7	Data Collection Methods: Surveys, Interviews, Experiments
Week 8	Midterm Exam
Week 9	Data Collection Methods: Surveys, Interviews, Experiments
Week 10	Tools for Research in Computer Science (LaTeX, Reference Managers, SPSS/Matlab/Python Basics)
Week 11	Writing a Research Proposal: Structure and Components
Week 12	Writing Research Papers: Abstract, Introduction, Methodology, Results, Discussion, Conclusion
Week 13	Referencing Styles (APA, IEEE, ACM) and Academic Writing Standards, Presenting Research: Oral Presentations and Posters
Week 14	Case Studies of Research in Computer Science, Student Presentations of Research Proposals
Week 15	Prepare to final exam
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	•Dawson, C. (2015). Projects in Computing and Information Systems: A Student's Guide. Addison-Wesley. •Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publications. •ACM Digital Library, IEEE Xplore, SpringerLink (for journal papers). •Research Methods of Computer Science* | Ehtiram Raza Khan & Huma Anwar (1st ed., University Science Press, 2015)	No
Recommended Texts	A Guideline for the Methodology Chapter in Computer Science Dissertations , Marco Araujo (2024)	No
Websites	https://books.apple.com/us/book/research-methodology-in-computer science/id1500967447?utm_source=chatgpt.com "Research Methodology In Computer Science by Ryhan Ebad on Apple Books https://search.worldcat.org/title/Research-methods-of-computer science/oclc/911208012?utm_source=chatgpt.com "Research methods of computer science | WorldCat.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Cryptography**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ Lab ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-313**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	com		**College**	IMA	
Module Leader	Bashar Ibrahim Hameed		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	MOHAMMED ALI MAJEED HAMEED		**e-mail**	mohammed.ali.majeed@imamaladham.edu.iq	
Peer Reviewer Name	Nazar Salih AbdulHussein		**e-mail**	nazarsalih@imamaladham.edu.uiq	
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. Understand the fundamental principles and terminology of modern cryptology, including the distinction between cryptography and cryptanalysis. 2. Learn the general rules of cryptography, including the importance of key lengths for different security levels and the necessity of using well-established encryption algorithms. 3. Identify and differentiate between various types of cryptographic attacks, such as brute-force, analytical, implementation, and social engineering attacks. 4. Gain familiarity with historical ciphers (such as the substitution, Caesar, and affine ciphers) and the mathematical foundations of modular arithmetic as applied in cryptography. 5. Develop the ability to analyze and evaluate the security of cryptographic systems, understanding the importance of key management, algorithm transparency, and the concept of computational versus unconditional security.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Explains core cryptology concepts, including symmetric/asymmetric crypto, protocols, and data security goals (confidentiality, integrity, authentication). 2- Describes classic ciphers (e.g., substitution, affine, shift) and their cryptanalysis using modular arithmetic. 3- Defines modern symmetric cipher components, principles of confusion/diffusion, and compares stream vs. block ciphers. 4- Details specific algorithms like DES and AES, explaining their internal components (S-Boxes, Feistel, Key Schedule, ShiftRows, MixColumns). 5- Explains mathematical foundations of public-key cryptography and AES, including finite and Galois Fields. 6- Applies mathematical concepts (modular arithmetic, integer rings) to cryptographic calculations. 7- Analyzes simple ciphers using cryptanalytic techniques like frequency analysis and known-plaintext attacks. 8- Implements (conceptually or in code) core functions of algorithms like DES rounds or AES transformations. 9- Evaluates cryptographic security by estimating brute-force effort and understanding analytical attack protection.
Indicative Contents المحتويات الإرشادية	• Indicative content includes the following. • Introduction to Cryptography and Data Security • Overview of Cryptology • Symmetric Cryptography • Simple Symmetric Encryption: The Substitution Cipher • Cryptanalysis • General Thoughts on Breaking Cryptosystems • How Many Key Bits Are Enough? • Modular Arithmetic and More Historical Ciphers • Shift Cipher (or Caesar Cipher) • Affine Cipher • Stream Ciphers

	• Random Numbers and an Unbreakable Stream Cipher • The One-Time Pad • Shift Register-Based Stream Ciphers • Linear Feedback Shift Registers (LFSR) • The Data Encryption Standard (DES) and Alternatives • Confusion and Diffusion • Internal Structure of DES

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy adopted for delivering this module is to encourage students' participation in exercises while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and conducting simple experiments involving sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	4 and 10	LO #1, #2, #3, and #8, #9
	Assignments	2	10% (10)	2 and 12	LO #4, #5 and #6, #7
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)	13	LO #1, #3 and #9
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	● Overview of the cryptology
Week 2	● Cryptanalysis ● The Substitution Cipher
Week 3	● Stream ciphers ● Modular arithmetic
Week 4	● Modular Arithmetic
Week 5	● Monoalphabetic cipher ● Caesar cipher and Affine cipher
Week 6	● Polyalphabetic cipher ● Playfair cipher
Week 7	● Stream Ciphers ● One-Time Pad (OTP)
Week 8	**Midterm Exam**
Week 9	● Block ciphers
Week 10	● DES Algorithm
Week 11	● Principles of Asymmetric Cryptography
Week 12	● Essential Number Theory for Public-Key Algorithms
Week 13	● The RSA Cryptosystem
Week 14	● The RSA Cryptosystem
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	General review of the Python programming language
Week 2	What are the data types in Python?
Week 3	Caesar Cipher Encoder
Week 4	Caesar Cipher Decoder
Week 5	Affine Cipher Decoder and Decoder
Week 6	Playfair cipher Encoder
Week 7	Playfair cipher Decoder
Week 8	Midterm Exam

Week 9	OTP Cipher Encoder
Week 10	OTP Cipher Decoder
Week 11	DES Cipher Encoder
Week 12	DES Cipher Decoder
Week 13	RSA Cipher Encoder
Week 14	RSA Cipher Decoder
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• ChristofPaar, Jan Pelzl, and Bart Preneel. "Understanding Cryptography: A Textbook for Students and Practitioners." Springer (2010). by Second Edition	no
Recommended Texts	• A.Menezes, P. van Oorschot, S. Vanstone, Handbook of Applied Cryptography. • H.v.Tilborg (ed.), Encyclopedia of Cryptography and Security, Springer, 2005. • William Stallings. Cryptography and Network Security Principles and Practice. Fifit Edition.	no
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Cryptography**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ Lab ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-313**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		3	**Semester of Delivery**		5
Administering Department		com	**College**	IMA	
Module Leader	*Bashar Ibrahim Hameed*		**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	MOHAMMED ALI MAJEED HAMEED		**e-mail**	mohammed.ali.majeed@imamaladham.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		00/00/2025	**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. Understand the fundamental principles and terminology of modern cryptology, including the distinction between cryptography and cryptanalysis. 2. Learn the general rules of cryptography, including the importance of key lengths for different security levels and the necessity of using well-established encryption algorithms. 3. Identify and differentiate between various types of cryptographic attacks, such as brute-force, analytical, implementation, and social engineering attacks. 4. Gain familiarity with historical ciphers (such as the substitution, Caesar, and affine ciphers) and the mathematical foundations of modular arithmetic as applied in cryptography. 5. Develop the ability to analyze and evaluate the security of cryptographic systems, understanding the importance of key management, algorithm transparency, and the concept of computational versus unconditional security.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Explains core cryptology concepts, including symmetric/asymmetric crypto, protocols, and data security goals (confidentiality, integrity, authentication). 2- Describes classic ciphers (e.g., substitution, affine, shift) and their cryptanalysis using modular arithmetic. 3- Defines modern symmetric cipher components, principles of confusion/diffusion, and compares stream vs. block ciphers. 4- Details specific algorithms like DES and AES, explaining their internal components (S-Boxes, Feistel, Key Schedule, ShiftRows, MixColumns). 5- Explains mathematical foundations of public-key cryptography and AES, including finite and Galois Fields. 6- Applies mathematical concepts (modular arithmetic, integer rings) to cryptographic calculations. 7- Analyzes simple ciphers using cryptanalytic techniques like frequency analysis and known-plaintext attacks. 8- Implements (conceptually or in code) core functions of algorithms like DES rounds or AES transformations. 9- Evaluates cryptographic security by estimating brute-force effort and understanding analytical attack protection.
Indicative Contents المحتويات الإرشادية	• Indicative content includes the following. • Introduction to Cryptography and Data Security • Overview of Cryptology • Symmetric Cryptography • Simple Symmetric Encryption: The Substitution Cipher • Cryptanalysis • General Thoughts on Breaking Cryptosystems • How Many Key Bits Are Enough? • Modular Arithmetic and More Historical Ciphers • Shift Cipher (or Caesar Cipher) • Affine Cipher • Stream Ciphers • Random Numbers and an Unbreakable Stream Cipher

	• The One-Time Pad • Shift Register-Based Stream Ciphers • Linear Feedback Shift Registers (LFSR) • The Data Encryption Standard (DES) and Alternatives • Confusion and Diffusion • Internal Structure of DES • The Advanced Encryption Standard (AES) • Some Mathematics: A Brief Introduction to Galois Fields

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The primary strategy adopted for delivering this module is to encourage students' participation in exercises while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and conducting simple experiments involving sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	4 and 10	LO #1, #2, #3, and #8, #9
	Assignments	2	10% (10)	2 and 12	LO #4, #5 and #6, #7
	Projects / Lab.	1	10% (10)/ 10% (10)		
	Report	1	10% (10)	13	LO #1, #3 and #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	● Overview of the cryptology ● Basics of symmetric cryptography ● Cryptanalysis
Week 2	● Substitution cipher ● Modular arithmetic ● Caesar cipher and Affine cipher
Week 3	● Stream ciphers ● Random number generators (RNGs) ● One-Time Pad (OTP)
Week 4	● Linear feedback shift registers (LFSRs) ● Trivium: a modern stream cipher
Week 5	● Overview of the DES Algorithm ● Internal Structure of DES ● Security of DES
Week 6	● Overview of the AES algorithm ● Internal structure of AES ● Practical issues
Week 7	● Encryption with Block Ciphers: Modes of Operation ● Increasing the Security of Block Ciphers
Week 8	**Midterm Exam**
Week 9	● Symmetric Cryptography Revisited ● Principles of Asymmetric Cryptography
Week 10	● Practical Aspects of Public-Key Cryptography ● Important Public-Key Algorithms
Week 11	● Essential Number Theory for Public-Key Algorithms
Week 12	● The RSA Cryptosystem
Week 13	● Attacks and Countermeasures
Week 14	● Diffie–Hellman Key Exchange
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

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

Week 1	General review of the Python programming language
Week 2	What are the data types in Python?
Week 3	Caesar Cipher Encoder
Week 4	Caesar Cipher Decoder
Week 5	Affine Cipher Encoder
Week 6	Affine Cipher Decoder
Week 7	OTP Cipher Encoder
Week 8	Midterm Exam
Week 9	OTP Cipher Decoder
Week 10	DES Cipher Encoder
Week 11	DES Cipher Decoder
Week 12	AES Cipher Encoder
Week 13	AES Cipher Decoder
Week 14	RSA Cipher Encoder & Decoder
Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• ChristofPaar, Jan Pelzl, and Bart Preneel. "Understanding Cryptography: A Textbook for Students and Practitioners." Springer (2010). by Second Edition	no
Recommended Texts	• A.Menezes, P. van Oorschot, S. Vanstone, Handbook of Applied Cryptography. • H.v.Tilborg (ed.), Encyclopedia of Cryptography and Security, Springer, 2005. • William Stallings. Cryptography and Network Security Principles and Practice. Fifit Edition.	no
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Intelligent**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ Lab ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-312**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		3	**Semester of Delivery**		5
Administering Department		Com	**College**	IMA	
Module Leader	*Zahraa A. Abdalkareem*		**e-mail**	zahraaadnan@imamaladham.edu.iq	
Module Leader's Acad. Title		Assist prof	**Module Leader's Qualification**		Ph.D.
Module Tutor	Nora Najim Abed		**e-mail**	Nora@imamaladham.edu.iq	
Peer Reviewer Name		*Bashar Ibrahim Hameed*	**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-122	**Semester**	2
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 course first introduces students to the meaning of the term artificial intelligence and its diverse applications for solving numerous problems. Second, it introduces the basics of artificial intelligence, including algorithms or computer programs that mimic human or animal mental abilities or other behavioral patterns, enabling a computer or other machine to learn, infer, and react to specific situations previously unknown to the machine.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowledge in the field of artificial intelligence 2- Employing artificial intelligence in the service of society 3- Defining the applications of artificial intelligence 4- Using artificial search algorithms 5- The student names the types of searching algorithm.
Indicative Contents المحتويات الإرشادية	• Introduction to AI • Intelligent Agents • Agents and Environments, Structure of Agents. • Problem Solving by Searching • Problem Solving Agents, Searching for Solutions, Uninformed Search Strategies: • Breadth-First Search, Depth-First Search, Depth-limited Search, Iterative Deepening . • Depth-first Search, Comparison of Uninformed Search Strategies. • Informed Search and Exploration Chapter 4 • Informed (Heuristic) Search Strategies: Greedy Best-first Search, A* Search, Heuristic • Functions, Local Search Algorithms and Optimization Problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy adopted for delivering this module is to encourage students' participation in exercises while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and conducting simple experiments involving sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	LO #1, #2, #3, and #5
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #5
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)	13	LO #1, #3 and #4
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #3
	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 AI
Week 2	Agents Intelligence
Week 3	Applications of AI
Week 4	Problem-solving
Week 5	Search algorithm
Week 6	Heuristic search
Week 7	Search in complex environment
Week 8	Mid-term exam
Week 9	Local search in optimization problem
Week 10	Game theory
Week 11	Assignment
Week 12	Backtracking search
Week 13	Project
Week 14	Review
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	General review of the Python programming language
Week 2	What are the data types in Python?
Week 3	Search algorithm
Week 4	Problem-solving
Week 5	Breadth-First Search, Depth-limited Search
Week 6	Depth-First Search
Week 7	Iterative Deepening
Week 8	Mid-term exam
Week 9	Travelling salesman
Week 10	Local search in optimization problem
Week 11	Game theory
Week 12	Backtracking search
Week 13	Assignment
Week 14	Project
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Artificial Intelligence: A Modern Approach Second Edition by Stuart J. Russell & Peter Norvig (2003, Prentice Hall, ISBN 0-13-080302-2) ⎪ "Artificial Intelligence – Structures and Strategies for Complex problem solving", George F. Luger, Pearson International Edition, Sixth edition, 2009.	no
Recommended Texts		no
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Quran memorization 3			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	IMA- 305				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		3	**Semester of Delivery**		5
Administering Department		COM	**College**	IMA	
Module Leader	Mohammed hameed mohammed		**e-mail**	m.alsomaidy@imamaladham.edu.iq	
Module Leader's Acad. Title		Assistant lecturer	**Module Leader's Qualification**		Master's
Module Tutor			**e-mail**		
Peer Reviewer Name		*Bashar Ibrahim Hameed*	**e-mail**	bashar_ibrahim@imamaladham.edu.iq	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMA- 205	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. إتمام حفظ الجزء الثالث من سورة البقرة حفظًا متقنًا. ٢. تعزيز مهارات التلاوة الصحيحة وضبط أحكام التجويد بمستوى أعلى من الإتقان. ٣. ترسيخ عادة المراجعة المستمرة للأجزاء المحفوظة (الأول والثاني والثالث) لضمان ثبات الحفظ. ٤. تدريب الطلبة على الاستفادة من الأسلوب القرآني في تنمية القدرة اللغوية والفكرية. ٥. تحصين الطلبة من الانحرافات الفكرية، وترسيخ مبادئ الوسطية والاعتدال المستمدة من القرآن الكريم. ٦. تنمية الجانب الإيماني من خلال ربط الطالب بالمعاني العامة والوقفات التربوية للآيات. ٧. تعزيز الأخلاق القرآنية في تعاملات الطالب داخل الجامعة وخارجها. ٨. غرس الطمأنينة والاستقرار النفسي عبر التلاوة الدائمة وحفظ القرآن الكريم. ٩. إعداد الطالب لمواصلة حفظ الأجزاء القرآنية اللاحقة بثقة ورغبة راسخة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	بعد إتمام هذه المادة يُتوقع من الطالب أن يكون قادرًا على: ١. حفظ الجزء الثالث من سورة البقرة حفظًا صحيحًا ومتقنًا. ٢. تلاوة السور المحفوظة تلاوة مجودة تراعي أحكام للتجويد. ٣. المحافظة على الحفظ السابق (الجزئيين الأول والثاني) مع الجمع بينه وبين الحفظ الجديد. ٤. اكتساب قدرة لغوية وبيانية أرقى من خلال التعايش مع الأسلوب القرآني. ٥. التخلق بأخلاق القرآن الكريم وتجسيدها في سلوك عملي داخل الجامعة والمجتمع. ٦. ترسيخ الفكر الوسطي المعتدل والابتعاد عن الغلو والتطرف والأفكار الهدامة. ٧. استحضار بعض المعاني التربوية والإيمانية التي تقوي الجانب الروحي والأخلاقي. ٨. تعزيز الشعور بالطمأنينة والسكينة النفسية من خلال ملازمة القرآن الكريم. ٩. إظهار قدرة متقدمة في الجمع بين الحفظ والمراجعة، تؤهله للانتقال إلى حفظ أجزاء جديدة من القرآن الكريم.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الارشادي مايلي: ١. مقاطع سماعية. ٢. رسوم توضيحية. ٣. طريقة القرآءة الفردية. ٤. طريقة القراءة الجماعية. ٥. طريقة القراءة الترديدية الفردية ٦. طريقة القراءة الترديدية الجماعية.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١- إعطاء الواجبات البيتية لغرض التقوية والحفظ . ٢- القراءة الصوتية من قبل الأستاذ على الطلبة. ٣- اتباع طرق القراءة الأربعة وحسب ما يراه الاستاذ (الجماعية والفردية والترديدية والجماعية الترديدية). ٤- الاستماء الى المقاطع الصوتية المعدة من قبل الاستاذ

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	17	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.13
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	33	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1 #2 and #8 #4
	homework	10	10% (10)	continuous	LO #3 #4 and #7 #9
	classwork	10	10% (10)	continuous	LO #2 #5 and #6 #8
	Projects / Lab.				
	Report	1	10% (10)	13	LO #1 - #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	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	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٥٣) إلى الآية رقم (٢٥٦)
Week 2	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٥٧) إلى الآية رقم (٢٥٩)
Week 3	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٦٠) إلى الآية رقم (٢٦٤)
Week 4	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٦٥) إلى الآية رقم (٢٦٩)
Week 5	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٧٠) إلى الآية رقم (٢٧٤)
Week 6	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٧٥) إلى الآية رقم (٢٨١)
Week 7	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٨٢) إلى الآية رقم (٢٨٣)

Week 8	اختبار نصف الفصل
Week 9	حفظ الجزء الثالث من سورة البقرة من الآية رقم (٢٨٣) إلى سورة آل عمران الآية رقم (٩)
Week 10	حفظ الجزء الثالث من سورة آل عمران من الآية رقم (١٠) إلى الآية رقم (٢٢)
Week 11	حفظ الجزء الثالث من سورة آل عمران من الآية رقم (٢٣) إلى الآية رقم (٣٧)
Week 12	حفظ الجزء الثالث من سورة آل عمران من الآية رقم (٣٨) إلى الآية رقم (٥٢)
Week 13	حفظ الجزء الثالث من سورة آل عمران من الآية رقم (٥٣) إلى الآية رقم (٧٠)
Week 14	حفظ الجزء الثالث من سورة آل عمران من الآية رقم (٧١) إلى الآية رقم (٩١)
Week 15	اختبار واستماع
Week 16	اختبار نهاية الفصل

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	القرآن الكريم	Yes
Recommended Texts	١- تفسير القرآن الكريم (محد علي الصابوني)	Yes
Websites	- https://youtu.be/fpXW6nZC7WE?si=iclZ33RViuNPIYeH	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Knowledge representation			**Module Delivery**	
Module Type	Core			☒Theory ☒Lecture ☐ Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	COM-312				
ECTS Credits	4				
SWL (hr/sem)	2				
Module Level		3	**Semester of Delivery**		Six
Administering Department			**College**	Al-Imam Al-Adham University College	
Module Leader	*Assist Prof. Dr. Zahraa A. Abdalkareem*		**e-mail**	zahraaadnan@imamadham.edu.iq	
Module Leader's Acad. Title		Assist Prof.	**Module Leader's Qualification**		PhD.
Module Tutor	*Assist Prof. Dr. Zahraa A. Abdalkareem*		**e-mail**	zahraaadnan@imamadham.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Artificial Intelligent	**Semester**	Five
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To introduce Knowledge Representation as a research area; 2. To give a complete and critical understanding of the notion of representation languages and logics.; 3. To study description logics and their use; 4. To study epistemic logics and their use; 5. To study the trade-off between expressive power and computational complexity of reasoning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Translate between English and the languages of modal and description logics. 2. Explain whether formulas of propositional, modal and description logic are true or valid. 3. Analyse simple scenarios involving knowledge, and represent them in modal and description logics. 4. Apply formal proof methods in description logics. 5. Problem Identification 6. Critical Analysis 7. Solution Synthesis 8. Evaluation of Problems and Solutions
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Conceptual Understanding** **Students begin by understanding the core concepts of knowledge representation, including logic-based representation, semantic networks, frames, ontologies, and rule-based systems. Emphasis is placed on understanding *how knowledge is structured and reasoned***

	rather than memorization. **2. Active Learning** **Learners actively engage through problem-solving exercises, modeling real-world scenarios using appropriate knowledge representation techniques, and writing logical expressions or rules to represent domain knowledge.** **3. Hands-on Practice** **Students implement knowledge representation models using programming languages or tools such as Prolog, OWL, or Python-based frameworks. Practical coding assignments strengthen the link between theory and implementation.** **4. Case-Based Learning** **Real-world case studies are used to demonstrate how knowledge representation is applied in expert systems, semantic web applications, and intelligent systems, helping students understand practical relevance.** **5. Collaborative Learning** **Group discussions and team-based projects encourage students to design and compare different representation schemes. Collaboration enhances reasoning skills and exposes learners to multiple perspectives.** **6. Self-Assessment and Reflection** **Students use quizzes, practice problems, and reflective exercises to assess their understanding and identify conceptual gaps for improvement.** **7. Project-Based Learning** **Mini-projects or capstone projects require students to model a domain, represent knowledge formally, and perform reasoning tasks. This approach reinforces integration of multiple KR techniques.** **8. Progressive Learning Approach** **The subject progresses from simple representations (propositional logic) to more complex systems (first-order logic, ontologies, and description logics), ensuring gradual skill development.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	2	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1
Unstructured SWL (h/sem)	64	**Unstructured SWL (h/w)**	4

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	2,5	LO #1, #2 and #10, #11
	Assignments	1	10	6	LO #3, #4 and #6, #7
	Projects / Lab.	1	10	8	All
	Report	1	10	9	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1	10	7	LO #1 - #7
	Final Exam	1	50	15	All
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Knowledge Representation** What is knowledge? Data vs Information vs Knowledge Role of KR in Artificial Intelligence Applications of Knowledge Representation
Week 2	**Intelligent Agents and Knowledge-Based Systems** Intelligent agents Knowledge-based agents Architecture of knowledge-based systems Environment types
Week 3	**Logic as a Knowledge Representation** Propositional logic Syntax and semantics Logical connectives Truth tables
Week 4	**Inference in Propositional Logic** Logical equivalence Inference rules

	Resolution Forward and backward chaining
Week 5	**First-Order Predicate Logic (FOPL)** Syntax and semantics Quantifiers Predicates, constants, variables Translating English sentences into FOPL
Week 6	**Reasoning in First-Order Logic** Unification Resolution in FOPL Skolemization Limitations of FOPL
Week 7	**Knowledge Representation Using Rules** Rule-based systems Production rules Inference engines Conflict resolution strategies
Week 8	**Midterm Exam**
Week 9	**Description Logics** Motivation for description logics Basic constructs Reasoning tasks Relationship with ontologies
Week 10	Uncertain Knowledge Representation Need for uncertainty handling Probability theory (overview) Bayesian reasoning (introductory) Limitations
Week 11	**Knowledge Representation Tools** Introduction to Prolog Facts, rules, queries Simple knowledge bases Reasoning using Prolog

Week 12	**Case Studies and Applications** Expert systems Medical diagnosis systems Recommendation systems Semantic search engines
Week 13	**Project Presentation** Mini-project demonstrations Review of core concepts Course summary and future directions
Week 14	**Review**
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	**Midterm Exam**
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	**Final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Security			**Module Delivery**	
Module Type	C			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	COM-333				
ECTS Credits	6				
SWL (hr/sem)	٤				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Computer Science		**College**	Al-Imam Al-Adham University College	
Module Leader	أ.م.مصطفى محمد عكاوي		**e-mail**	mostafaakawi@imamaladham.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Masters	
Module Tutor	زينب ثامر كامل		**e-mail**	zeynepalomary@gmail.com	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Com-313	**Semester**	None
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Understand Fundamentals and Threats:** To grasp the core principles of information security (Confidentiality, Integrity, and Availability) and identify various types of system vulnerabilities, threats, and malicious code. 2. **Implement Defense Mechanisms:** To gain technical proficiency in deploying security tools such as firewalls, Intrusion Detection Systems (IDS), and robust authentication and authorization protocols to protect network infrastructures. 3. **Apply Security Engineering and Web Safety:** To learn the principles of designing secure systems and identifying common web vulnerabilities (like SQLi and XSS) to build robust and resilient software applications. 4. **Evaluate Legal and Ethical Frameworks:** To analyze the organizational, legal, and international aspects of computer security, including risk management models and the ethical implications of modern technologies like biometrics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Define Core Security Principles:** Explain the fundamental concepts of the CIA triad (Confidentiality, Integrity, and Availability) and their importance in protecting data. 2. **Analyze Threats and Vulnerabilities:** Identify and categorize various system vulnerabilities and the types of threats that exploit them. 3. **Implement Access Controls:** Distinguish between and implement different **Authentication** and **Authorization** mechanisms to secure system access. 4. **Mitigate Malicious Code:** Recognize various types of malware (Viruses, Worms, Trojans) and apply effective **countermeasures** to defend against them. 5. **Configure Network Defenses:** Design and configure **Firewalls** and **Intrusion Detection Systems (IDS)** to monitor and protect network traffic. 6. **Secure Web Applications:** Detect and remediate common web-based vulnerabilities, such as **SQL Injection** and **XSS**, using secure coding practices. 7. **Apply Information Hiding:** Understand the techniques of **Steganography** and how information can be hidden within different digital media. 8. **Evaluate Biometric Systems:** Assess the effectiveness, accuracy, and privacy implications of using **Biometrics** for identity verification. 9. **Perform Risk Management:** Conduct security risk assessments and develop **Risk Models** to ensure system robustness and business continuity. 10. **Comply with Legal and Ethical Standards:** Demonstrate an understanding of the **legal, organizational, and international laws** governing computer security and digital privacy.
Indicative Contents المحتويات الإرشادية	1. **Foundations and Threat Landscapes:** Investigation of the core security principles—**Confidentiality, Integrity, and Availability (CIA Triad)**—alongside a deep dive into system **vulnerabilities**, various types of **malicious code** (viruses, worms, trojans), and the primary countermeasures used to mitigate these threats. 2. **Access Management and Network Defense:** Comprehensive study of

	Authentication and **Authorization** frameworks, complemented by technical defenses including the architecture and configuration of **Firewalls** and **Intrusion Detection Systems (IDS)** to secure network perimeters and internet traffic. 3. **Application Security and Data Protection:** Focus on **Security Engineering** principles, including the identification of modern web vulnerabilities (such as **SQL Injection** and **XSS**), as well as techniques for **Information Hiding** (Steganography) to ensure data privacy and system robustness. 4. **Strategic, Legal, and Emerging Issues:** Exploration of **Risk Models**, the implementation of **Biometric** technologies, and the **Legal, International, and Organizational** frameworks governing cybersecurity, including a review of current security incidents and trends reported in the global press.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Interactive Lectures:** Using multimedia presentations to introduce core concepts like the CIA triad and security engineering, while encouraging real-time discussions on current cybersecurity trends and press reports. 2. **Practical Laboratory Sessions:** Hands-on sessions in a controlled environment where students practice configuring **Firewalls**, setting up **IDS**, and performing vulnerability scanning to bridge the gap between theory and practice. 3. **Case Study Analysis:** Reviewing real-world security breaches and international cyber-attacks. This helps students understand the "Legal and Organizational Aspects" and the impact of security failures in the industry. 4. **Problem-Based Learning (PBL):** Presenting students with specific security "scenarios" (e.g., a suspected malware infection) and requiring them to diagnose the threat and propose effective **countermeasures**. 5. **Collaborative Group Projects:** Assigning teams to design a "Secure System Architecture." This encourages peer-to-peer learning and mimics the teamwork required in professional security engineering environments. 6. **Simulations and Gamification (CTF):** Implementing "Capture The Flag" (CTF) challenges where students compete to find vulnerabilities or hide information. This boosts engagement and sharpens technical problem-solving skills. 7. **Flipped Classroom Approach:** Providing pre-recorded videos or articles on topics like **Biometrics** or **Legal Aspects** before class, allowing the in-person session to be dedicated to deep-dive debates and complex problem-solving. 8. **Continuous Technical Assessment:** Using regular quizzes and "Lab Reports" to provide immediate feedback on the student's ability to implement security protocols and identify malicious code.

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	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.73
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10
	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)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		100% (100 Marks)

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**(Introduction to Security): - (Confidentiality, Integrity, Availability), (Vulnerabilities), (Threats).**
Week 2	**(Access Control): - (Authentication), (Authorization).**
Week 3	**(Malicious Code - Part 1): - (Viruses) ،(Worms) ،(Trojans).**
Week 4	**(Malicious Code - Part 2): - (Ransomware), (Countermeasures).**
Week 5	**(Internet Security): - (SSL/TLS, HTTPS), Threats related to web browsers and email.**
Week 6	**(Firewalls): - (Packet Filtering, Stateful Inspection, Proxy).**
Week 7	**(Intrusion Detection Systems - IDS): - (IDS), (IPS), (Signature-based vs Anomaly-based).**
Week 8	**Midterm Exam**

Week 9	**(Information Hiding): - (Steganography).**
Week 10	**(Web Application Security): -(SQL Injection)، How to write code that is protected from these vulnerabilities.**
Week 11	**(Biometrics) Using physical characteristics (fingerprint, face, iris) in security.**
Week 12	**(Security Engineering & Risk Models) (Robustness).**
Week 13	**(Legal & Organizational Aspects), International and local cybercrime laws.**
Week 14	**(Current Issues & Review)**
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Vulnerability Scanning and Reconnaissance - :Lab Activity: Using Nmap to perform network discovery and port scanning.**
Week 2	**Authentication and Password Security- :Lab Activity: Implementing Hashing algorithms (MD5, SHA-256) and using tools like John the Ripper or Hashcat**
Week 3	**Basic Malware Analysis (Sandbox Environment)- :Lab Activity: Setting up a Virtual Machine (VM) to safely observe the behavior of a "Trojan" or "Virus" sample**
Week 4	**Countermeasures and Endpoint Protection: - Lab Activity: Configuring advanced Antivirus (AV) policies and simulating a Ransomware attack to practice data recovery from backups.**
Week 5	**Network Traffic Analysis: - Lab Activity: Using Wireshark to capture and analyze network packets.**
Week 6	**Firewall Configuration: - Lab Activity: Setting up and testing rules in Windows Defender Firewall or Linux iptables/ufw.**
Week 7	**Intrusion Detection Systems (IDS): -Lab Activity: Installing and configuring Snort (Open-source IDS).**
Week 8	**Midterm Exam**
Week 9	**Information Hiding (Steganography): - Lab Activity: Using tools like Steghide or OpenStego to hide secret text within images and audio files.**
Week 10	**Web Application Security (OWASP Top 10): - Lab Activity: Practicing on the DVWA (Damn Vulnerable Web Application) environment.**
Week 11	**Biometric System Simulation: - Lab Activity: Implementing a basic Face Recognition or Fingerprint verification script using Python and OpenCV.**
Week 12	**Security Auditing and Risk Assessment: - Lab Activity: Running security audit tools (like MBSA or Nessus) on a workstation.**

Week 13	**Security Policies and Compliance: - Lab Activity: Developing an Acceptable Use Policy (AUP) and a Disaster Recovery plan for a mock organization.**
Week 14	**Capstone Lab: Capture The Flag (CTF): - Lab Activity: A competitive session where students apply all learned skills to solve security puzzles and "hack" into a target machine**
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. **Stamp, M. (2011).** *Information Security: Principles and Practice*. 2nd Edition. John Wiley & Sons. 2. **Pfleeger, C. P., Pfleeger, S. L., & Margulies, J. (2015).** *Security in Computing*. 5th Edition.	no
Recommended Texts	1. Dieter Gollman, “Computer Security”, 3rd edition, 2011 1. William Stallings, Lawrie Brown, "Computer Security: Principles and Practice", Prentice Hall, 3rd editio	no
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Distributed Database**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COM-325**				
ECTS Credits	5				
SWL (hr/sem)	4				
Module Level	3		**Semester of Delivery**	6	
Administering Department	COM		**College**	IMA	
Module Leader	Dr. Raya Mohammed Mahmood		**e-mail**	raya.mohammed@imamaladham.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	PhD	
Module Tutor	Mustafa Ahmed Muhi		**e-mail**	Mustafa.ahmed@imamaladham.edu.iq	
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	COM-315	**Semester**	5
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objectives of this course are to enable students to: 1. Understand the motivation and challenges of distributed databases. 2. Analyze distributed DBMS architectures and design choices. 3. Design fragmentation and replication strategies. 4. Explain distributed query processing and optimization. 5. Apply distributed transaction management concepts. 6. Understand atomic commit protocols and recovery mechanisms. 7. Evaluate modern distributed data systems critically.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the course, students will be able to: 1. Explain distributed data independence and transparency. 2. Compare distributed DBMS architectures. 3. Design correct and efficient data fragmentation schemes 4. Analyze distributed query execution plans. 5. Describe distributed transaction atomicity mechanisms. 6. Apply Two-Phase Commit (2PC) and recovery protocols. 7. Identify consistency, availability, and fault-tolerance trade-offs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Fundamentals of Distributed Databases 2. Distributed Database Objectives and Transparency 3. Types of Distributed Database Systems 4. Distributed DBMS Architectures 5. Data Distribution and Fragmentation 6. Data Replication and Consistency 7. Distributed Query Processing 8. Distributed Transactions and Concurrency Control 9. Atomic Commit Protocols and Recovery 10. Modern Trends in Distributed Data Management

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	· At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. · Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. · Attendance is compulsory in lecture which carries 10 marks in overall evaluation. · One internal exam will be conducted as a part of internal theory evaluation. · Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation. · Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation. · The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. · Experiments shall be performed in the laboratory related to course contents.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06
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	20% (20)	3,6	LO #1-#3, LO #3-#6, LO #6-#7
	Assignments	1	10% (10)	9	LO #3, #4 and #8
	Projects / Lab.	2	20% (20)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	all
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Distributed Databases
Week 2	Distributed Database Goals & Properties
Week 3	Types of Distributed Databases
Week 4	Distributed DBMS Architectures
Week 5	Data Distribution & Fragmentation
Week 6	Replication & Consistency
Week 7	Distributed Query Processing
Week 8	**Mid term**
Week 9	Distributed Transactions
Week 10	Two-Phase Commit (2PC) & Recovery
Week 11	Distributed DBMS vs NoSQL
Week 12	CAP theorem discussion
Week 13	Cloud-based distributed databases
Week 14	Project discussion
Week 15	Prepare to final exam
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Analyze real-world systems and identify distribution needs
Week 2	Evaluate transparency levels in sample systems
Week 3	Architecture diagram design
Week 4	Fragment a centralized schema horizontally
Week 5	Perform vertical fragmentation and validate correctness
Week 6	Design replication strategies for different workloads
Week 7	Compare execution strategies for a multi-site query
Week 8	Mid term
Week 9	Trace execution of a distributed transaction
Week 10	Simulate 2PC under normal and failure scenarios

Week 11	Analyze a real or hypothetical distributed data system
Week 12	Scenario-based problem solving
Week 13	Scenario-based problem solving
Week 14	Scenario-based problem solving
Week 15	Prepare to final exam
Week 16	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Hector Garcia-Molina, Jeffery D. Ullman, Jennifer Wisdom, database system the complete, 2nd Ed. 2-Paolo Atzeni, Stefano Ceri,Stefno Paraboschi and Riccardo Torlone, "Database Systems concepts, languages & architecture" .	no
Recommended Texts		no
Websites	https://www.tutorialspoint.com https://www.geeksforgeeks.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Pattern recognition**			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COM-326**				
ECTS Credits	5.00				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department			**College**	Al-Imam Al-Adham university college	
Module Leader	م.د. همام خالد ياسين		**e-mail**	humam.khalid@imamaladham.edu.iq	
Module Leader's Acad. Title	lecturer		**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**	None
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A pattern recognition module typically aims to provide students or participants with a comprehensive understanding of the principles, techniques, and applications of pattern recognition. Here are some key objectives: 1. **Understanding Fundamental Concepts**: o Introduce key concepts and terminology related to pattern recognition, including features, patterns, classes, and models. 2. **Application Insight**: o Explore various real-world applications of pattern recognition across different domains, such as computer vision, speech recognition, natural language processing, and biomedical analysis. 3. **Data Handling Skills**: o Develop skills in data acquisition, preprocessing, and management, preparing raw datasets for analysis. 4. **Feature Extraction Techniques**: o Teach methods for identifying and extracting relevant features from data, emphasizing their importance in improving classification performance. 5. **Classification Algorithms**: o Introduce various machine learning algorithms used for pattern classification, including supervised, unsupervised, and semi-supervised learning techniques. 6. **Model Training and Evaluation**: o Guide students in training models on labeled datasets and evaluating their performance using appropriate metrics (e.g., accuracy, precision, recall). 7. **Performance Improvement Techniques**: o Discuss strategies for enhancing model performance, such as feature selection, hyperparameter tuning, and cross-validation. 8. **Real-Time Processing**: o Explore the challenges and techniques involved in implementing pattern recognition systems that operate in real-time environments. 9. **Ethical Considerations**: o Address the ethical implications related to the deployment of pattern recognition technologies, such as privacy concerns and algorithmic bias. 10. **Hands-On Experience**: o Provide practical experience through projects or assignments that involve implementing pattern recognition algorithms using programming languages and libraries (e.g., Python, TensorFlow, scikit-learn).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Conceptual Understanding: Explain fundamental concepts and terminology related to pattern recognition, including features, patterns, classes, and models. • Application Awareness: Identify and describe various real-world applications of pattern recognition in fields such as computer vision, speech recognition, natural language processing, and healthcare. • Data Processing Skills: Demonstrate the ability to acquire, preprocess, and

	manage datasets, preparing them effectively for pattern recognition tasks. • Feature Extraction Proficiency: Apply different techniques for feature extraction and selection, recognizing their impact on model performance. • Algorithm Proficiency: Implement and apply various classification algorithms (e.g., decision trees, support vector machines, and neural networks) to solve pattern recognition problems. • Model Training and Evaluation: Train models on labeled datasets and evaluate their performance using appropriate metrics, demonstrating the ability to interpret evaluation results. • Performance Optimization: Utilize techniques for improving model performance, including hyperparameter tuning, cross-validation, and incorporating domain knowledge. • Real-Time System Implementation: Describe the challenges and strategies involved in implementing real-time pattern recognition systems, considering computational efficiency and accuracy. • Ethical Considerations: Analyze the ethical implications of deploying pattern recognition technologies, including issues related to privacy, bias, and fairness. • Practical Application: Complete hands-on projects that involve the implementation of pattern recognition algorithms using programming languages and libraries (e.g., Python, TensorFlow, scikit-learn).

Indicative Contents
المحتويات الإرشادية
	The indicative content provides a comprehensive overview of the key topics and concepts in a pattern recognition module. It ensures that students gain both theoretical knowledge and practical skills, equipping them for further studies or careers in artificial intelligence and machine learning.
	
	1. Introduction to Pattern Recognition
	  o Definitions and scope
	  o Historical context and development
	  o Importance in current technology
	2. Fundamental Concepts
	  o Basic terminology: features, patterns, classes, training data, testing data, models
	  o Overview of the pattern recognition process
	3. Data Acquisition and Preprocessing
	  o Methods of data collection
	  o Data cleaning and normalization techniques
	  o Handling missing values and noise reduction
	4. Feature Extraction and Selection
	  o Techniques and methods for feature extraction
	  o Dimensionality reduction techniques (e.g., PCA, t-SNE)
	  o Feature selection methods (e.g., filter, wrapper, embedded)
	5. Classification Techniques
	  o Overview of classification algorithms:
	  ▪ Supervised learning (e.g., Decision Trees, Support Vector Machines, Neural Networks)
	  ▪ Unsupervised learning (e.g., K-Means Clustering)

	▪ Semi-supervised and reinforcement learning o Ensemble methods (e.g., Random Forests, Boosting) 6. Model Training and Evaluation o Splitting datasets into training and testing sets o Training methods and algorithms o Evaluation metrics (accuracy, precision, recall, F1 score, confusion matrix) 7. Performance Optimization o Techniques for improving model performance o Hyperparameter tuning and cross-validation strategies o Avoiding overfitting and underfitting 8. Real-Time Pattern Recognition o Challenges in real-time processing o Approaches to optimize algorithms for speed o Case studies of real-time applications (e.g., facial recognition, autonomous vehicles) 9. Ethical Considerations in Pattern Recognition o Issues related to data privacy and security o Algorithmic bias and fairness o Ethical implications of deploying pattern recognition technologies 10. Practical Applications and Case Studies o Case studies of pattern recognition in various fields: ▪ Healthcare (e.g., medical imaging) ▪ Finance (e.g., fraud detection) ▪ Security (e.g., biometric systems) ▪ Marketing (e.g., customer segmentation) 11. Hands-On Projects and Assignments o Implementation of pattern recognition algorithms using programming languages and libraries (e.g., Python, TensorFlow, scikit-learn) o Real-world projects that apply learned techniques to solve practical problems 12. Future Trends in Pattern Recognition o Emerging technologies and research directions o Impact of advancements in AI and deep learning
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Interactive Lectures** o Use engaging presentations with visuals and examples to explain core concepts. o Encourage questions and discussions during lectures to promote active participation. 2. **Hands-On Practical Sessions** o Incorporate lab sessions where students can implement algorithms using programming languages and tools (e.g., Python, TensorFlow). o Provide real-world datasets for students to practice data acquisition, preprocessing, feature extraction, and classification. 3. **Project-Based Learning** o Assign projects that involve solving real-world pattern recognition problems. This encourages students to apply their knowledge and skills in a practical context. o Promote collaborative group projects to enhance teamwork and

	critical thinking. 4. **Case Studies Analysis** o Use case studies to demonstrate the application of pattern recognition in various domains (e.g., healthcare, finance). o Facilitate group discussions to analyze challenges, solutions, and outcomes in these case studies. 5. **Flipped Classroom Approach** o Provide learning materials (e.g., videos, articles) for students to study before class. o Use class time for discussions, problem-solving, and clarification of concepts, fostering deeper understanding. 6. **Workshops and Guest Lectures** o Invite industry professionals or researchers to conduct workshops or guest lectures. This provides insights into cutting-edge practices and real-world applications. o Encourage students to engage with experts through Q&A sessions. 7. **Peer Learning and Collaboration** o Foster a collaborative learning environment where students can work in pairs or small groups on assignments and projects. o Implement peer review processes for assignments, allowing students to learn from each other's work. 8. **Utilization of Online Resources** o Recommend online platforms, and tutorials that complement classroom learning and provide additional practice. o Encourage students to participate in online forums or communities related to machine learning and pattern recognition. 9. **Regular Quizzes and Feedback** o Conduct short quizzes or reflections to assess understanding of key concepts regularly. o Provide timely and constructive feedback on assignments and projects to guide students' learning. 10. **Evaluation and Reflection** o Incorporate self-assessment and reflection activities, allowing students to evaluate their learning and identify areas for improvement. o Use end-of-module evaluations to gather feedback on teaching effectiveness and course content.

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	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06
Total SWL (h/sem)	**125**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #5, #6
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #7, #8
	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 - #6
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to pattern recognition** **Pattern recognition system**
Week 2	**Reducing dimensionality** **Subset selection** **Feature Extraction** • Importance of features in pattern recognition • Techniques for feature extraction: shape, texture, color, etc.
Week 3	**Feature reduction** • Dimensionality reduction techniques (PCA, LDA) • Feature selection methods
Week 4	**Distance Metrics and Similarity Measures** • Common distance metrics (Euclidean, Manhattan, Cosine) • Similarity measures and their applications • Mahalanobis distance • Applications in clustering and classification

Week 5	**Classical Classifiers**
	• Introduction to various classifiers:
	  ○ k-Nearest Neighbors (k-NN)
	  ○ Linear Discriminant Analysis (LDA)
	  ○ Logistic Regression
	• Performance metrics: confusion matrix, accuracy, precision, recall
	• Hands-on examples and applications

Week 6	**Support Vector Machines (SVM)** • Introduction to SVMs and concepts of margins • Soft margin and kernel trick

	• Multi-class classification approach
Week 7	**Decision Trees and Random Forests** • Basics of decision trees and their construction • Overfitting and pruning techniques • Introduction to ensemble methods: Random Forest • Advantages and limitations of tree-based methods
Week 8	Mid Exam
Week 9	**Neural Networks and Deep Learning** • Introduction to artificial neural networks (ANN) • Concepts of forward and backward propagation • Training techniques and loss functions • Overview of deep learning architectures (CNN, RNN)
Week 10	**Convolutional Neural Networks (CNN)** • Architecture of CNNs and their components (convolution layers, pooling layers) • Applications in image recognition and processing • Transfer learning and pre-trained models
Week 11	**Clustering Techniques** • Introduction to clustering: k-means, hierarchical clustering, DBSCAN • Evaluation of clustering results • Applications of clustering in market segmentation and anomaly detection
Week 12	**Hidden Markov Models (HMM)** • Basics of HMM and its components • Applications in time-series data and sequential pattern recognition • Training HMMs using the Baum-Welch algorithm • Practical examples in speech and handwriting recognition
Week 13	**Model Evaluation and Performance Metrics** • Overview of model evaluation techniques • Cross-validation methods • ROC curves and AUC • Bias-variance trade-off and overfitting
Week 14	**Pattern Recognition in Natural Language Processing** • Introduction to text data and feature extraction techniques (TF-IDF, word embeddings) • Applications in sentiment analysis and document classification • Overview of state-of-the-art models (BERT, LSTM)
Week 15	**Review**
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Python for PR & Environment Setup
Week 2	Dimensionality Reduction
Week 3	Principal component analysis

Week 4	Feature selection
Week 5	Filter method
Week 6	Wrapper method
Week 7	Implementing k-Nearest Neighbors (k-NN) Classifier
Week 8	Mid-term exam
Week 9	Training SVMs with Linear and Non-linear Kernels
Week 10	Building Decision Trees (ID3 Algorithm)
Week 11	Single Layer Perceptron and Backpropagation
Week 12	CNN models
Week 13	Performance Assessment: Plotting ROC Curves
Week 14	Feature Extraction for Natural Language Processing
Week 15	Review
Week 16	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Pattern recognition and classification: an introduction, Geoff Dougherty Pattern Recognition, 2nd edition, Richard O. Duda, Peter E. Hart, David G. Stork	No
Recommended Texts	Machine Learning – An Algorithmic Perspective, 3rd edition, Stephen Marsland	No
Websites		

Grading Scheme
مخطط الدرجات

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

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Web applications development**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COM-322**				
ECTS Credits	٦				
SWL (hr/sem)	١٥٠				
Module Level	3		**Semester of Delivery**	2	
Administering Department	COM		**College**	IMA	
Module Leader	Mohammed Adnan Mohammed		**e-mail**	mohammed.adnan@imamaladham.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM-126	**Semester**	2
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. Construct well-structured web pages using semantic HTML to ensure content clarity and accessibility. 2. Apply CSS properties to control layout, typography, and color for visually engaging user interfaces. 3. Implement responsive design techniques to ensure web applications function seamlessly across mobile, tablet, and desktop devices. 4. Develop client-side logic using JavaScript to create interactive elements and handle user-driven events. 5. Manipulate the Document Object Model (DOM) to dynamically update page content without requiring a full browser refresh. 6. Create and validate interactive HTML forms to capture, process, and sanitize user input effectively. 7. Utilize browser developer tools to diagnose, debug, and optimize frontend code for better performance. 8. Integrate external assets, such as fonts, icons, and libraries, while maintaining organized project directory structures. 9. Execute basic version control workflows to manage code iterations and track development progress. 10. Analyze and troubleshoot cross-browser compatibility issues to ensure a consistent user experience.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Analyze the architectural components of the World Wide Web, including the client-server model, HTTP/HTTPS protocols, and request-response cycles. 2. Construct accessible and semantically correct web documents using HTML to ensure content is machine-readable and inclusive. 3. Synthesize advanced CSS3 techniques, such as Flexbox and Grid, to create responsive layouts that adapt to diverse screen sizes and devices. 4. Develop complex client-side logic using JavaScript to manage state, handle user events, and perform asynchronous data fetching (AJAX/Fetch). 5. Manipulate the Document Object Model (DOM) programmatically to create dynamic, high-performance user interfaces without full page reloads. 6. Architect robust backend services and RESTful APIs using server-side environments (PHP, or Python) to handle application business logic. 7. Integrate relational or non-relational databases into applications, performing secure CRUD (Create, Read, Update, Delete) operations. 8. Evaluate and mitigate common web security vulnerabilities, including

	Cross-Site Scripting (XSS), SQL Injection, and Cross-Site Request Forgery (CSRF). 9. Utilize version control systems (like Git) and collaborative workflows to manage codebases and track project iterations. 10. Deploy fully functional full-stack applications to cloud hosting environments using modern CI/CD (Continuous Integration/Continuous Deployment) practices.
Indicative Contents المحتويات الإرشادية	1. Indicative content includes the following. 2. Introduction To Course 3. Introduction HTML 4. Introduction CSS 5. Introduction PHP 6. Others (Exam, PCA)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Lectures serve as the foundation for delivering theoretical concepts, principles, and frameworks of web engineering. 2. Case Studies: Presenting case studies of successful web applications or notable web engineering projects can provide valuable insights into industry practices, challenges, and innovative solutions. 3. Group Discussions and Debates: Encouraging group discussions and debates on web programming topics can foster critical thinking, collaboration, and communication skills. 4. Online Resources and Tutorials: Providing students with access to online resources, tutorials, and learning platforms can supplement their understanding of web development concepts. 5. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, help gauge students' understanding and progress. Constructive feedback can guide students in improving their skills and knowledge. 6. Continuous Learning and Professional Development: Encouraging students to stay updated with the latest advancements in web programming and providing resources for self-study can foster a culture of continuous learning.

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	4.2
Unstructured SWL (h/sem)	86	**Unstructured SWL (h/w)**	5.7

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #3#4
	Assignments	2	10% (10)	2 and 12	LO #5, #6 and #7, #8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	12	LO #3, #4 and #5, #6
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	Internet Technology, The Web Concepts, Uniform Resource Locator (URL) Internet Protocols.
Week 2	Web Design: Client-Server Architecture Web Browsers, Web Operations Site Structure Types Web Sites Website Design Issues.
Week 3	Front-end basics (HTML, CSS, JavaScript) HTML Document Structure, HTML Tags and Attributes, HTML Paragraphs HTML Character Entities.
Week 4	HTML List, HTML List Advantages List Types, Unordered Lists Ordered Lists Description
Week 5	CSS for Presentation, Fundamental and Advantages of CSS, Types of CSS, Linking CSS to a web page
Week 6	CSS ID for Presentation Formatting Text Formatting Lists Colors and Backgrounds Styling Table
Week 7	Page Layout with CSS Page Layout Strategies Fixed Layout
Week 8	Midterm exam
Week 9	Fluid Layout Elastic Layout, Hybrid Layout
Week 10	Back-end development (server-side languages like PHP, databases like SQL)
Week 11	Basic PHP, PHP with web pages.
Week 12	PHP with MySQL

Week 13	Introduction to APIs, RESTful Architecture, Data Formats and Communication, API Security a Authentication
Week 14	Full-Stack & Deployment, Full-Stack Integration, Authentication & Security, Version Control
Week 15	Review
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Uniform Resource Locator (URL) Internet Protocols.
Week 2	HTML Document Structure, HTML Structure, HTML Tags and Attributes
Week 3	HTML Headings, HTML Paragraphs HTML Character Entities.
Week 4	Internal linking Directory Linking Hyperlinking to other Content
Week 5	CSS for Presentation Formatting Text Formatting Lists Colors and Backgrounds Styling Tables.
Week 6	Page Layout with CSS Page Layout Strategies Fixed Layout
Week 7	Fluid Layout Elastic Layout, Hybrid Layout
Week 8	Basic PHP, PHP with web pages.
Week 9	PHP with MySQL.
Week 10	Full-Stack Integration
Week 11	Middleware & Error Handling
Week 12	web Security & Performance
Week 13	Deployment (Vercel/Heroku/AWS)
Week 14	Before final exam
Week 15	Review
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Learning Web Design, Jennifer Robbins, O'Reilly, 2012	No
Recommended Texts		

Websites	https://www.w3schools.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Operating system			**Module Delivery**	
Module Type	Core			☒Theory ☒Lecture ☒Lab ☐Tutorial ☒Practical ☐Seminar	
Module Code	COM321				
ECTS Credits	4				
SWL (hr/sem)	2				
Module Level		3	**Semester of Delivery**		6
Administering Department			**College**	Al Imam Al A'dham	
Module Leader	*Abubaker Jumaah*		**e-mail**	Abj87r@gmail.com	
Module Leader's Acad. Title		Lectuter	**Module Leader's Qualification**		Ph.D
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	First	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	COM223	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives **أهداف المادة الدراسية**	This module aims to: • Introduce students to the fundamental concepts and principles of operating systems. • Explain the role of operating systems in managing computer hardware and software resources. • Develop students' understanding of process, memory, file, and I/O management. • Provide students with analytical skills to evaluate operating system design and performance. • Bridge theoretical concepts with practical operating system applications. • Prepare students to work with modern operating systems in academic and professional environments.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Upon successful completion of this module, students will be able to: 1. Describe the basic structure and functions of an operating system. 2. Distinguish between different types of operating systems and their characteristics. 3. Explain process management concepts, including processes, threads, and scheduling. 4. Analyze CPU scheduling algorithms and their performance criteria. 5. Explain memory management techniques, including virtual memory. 6. Describe file system structures and file management operations. 7. Explain input/output management and device handling mechanisms. 8. Apply operating system concepts to practical scenarios and problem-solving tasks. 9. Use basic commands and tools of a modern operating system (e.g., Linux) in practical exercises.
Indicative Contents **المحتويات الإرشادية**	• Introduction to Operating Systems • Operating System Structures and Functions • Types of Operating Systems • Process Management • CPU Scheduling Algorithms • Process Synchronization and Deadlocks • Memory Management • Virtual Memory • File Systems and File Management • Input/Output Management

	• Security and Protection in Operating Systems • Practical Introduction to a Modern Operating System (Linux/Windows)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Lectures** to introduce and explain fundamental concepts of operating systems using structured presentations. 2. **Interactive discussions** to enhance conceptual understanding and encourage critical thinking. 3. **Problem-based learning** through analysis of real-world operating system scenarios. 4. **Practical laboratory sessions** to apply theoretical concepts using a modern operating system environment. 5. **Demonstrations** of operating system functionalities and tools. 6. **Case studies** to illustrate operating system design and management issues. 7. **Self-directed learning** through assigned readings and independent study. 8. **Formative assessments** and in-class activities to monitor student progress and understanding.

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**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	67	**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	2,5	LO #1, #2 and #10, #11
	Assignments	1	10	6	LO #3, #4 and #6, #7
	Projects / Lab.	1	10	8	All
	Report	1	10	9	LO #5, #8 and #10
Summative assessment	Midterm Exam	1	10	7	LO #1 - #7
	Final Exam	1	50	15	All
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the laboratory environment, lab rules, and safety guidelines. Overview of the operating system used in the lab.
Week 2	Installation and configuration of a modern operating system (Linux/Virtual Machine setup).
Week 3	Basic operating system commands and file system navigation.
Week 4	Process management: viewing and controlling processes using system tools.
Week 5	CPU scheduling concepts and practical observation of scheduling behavior.
Week 6	Memory management basics: monitoring memory usage and performance.
Week 7	Virtual memory and paging concepts with practical demonstrations.
Week 8	**Midterm Exam**
Week 9	File systems: file creation, permissions, and directory management.
Week 10	Process synchronization and introduction to deadlocks (conceptual lab exercises).
Week 11	System monitoring and performance evaluation tools.
Week 12	Basic security concepts: user accounts, permissions, and access control.
Week 13	Mini lab project or applied practical tasks integrating multiple OS concepts.
Week 14	Lab revision, troubleshooting, and preparation for final practical assessment.
Week 15	**Final Exam**

Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
	Material Covered
Week 1	**Introduction to Operating Systems Lab** – Setting up the environment (Linux/Windows), basic shell commands, file system navigation.
Week 2	**Process Management Lab** – Creating and managing processes, understanding process states, using ps, top, kill commands.
Week 3	**CPU Scheduling Lab** – Implementing simple scheduling algorithms (FCFS, SJF) using simulation in code.
Week 4	**Threads and Concurrency Lab** – Creating and managing threads, basic multithreading exercises.
Week 5	**Inter-Process Communication (IPC) Lab** – Pipes, shared memory, message queues, simple producer-consumer problem.
Week 6	**Memory Management Lab** – Understanding paging, segmentation, and simple memory allocation exercises.
Week 7	**File Systems Lab** – Creating, reading, writing, and manipulating files; permissions and attributes.
Week 8	**Midterm Exam**
Week 9	**Deadlocks Lab** – Simulating deadlock conditions, prevention and avoidance strategies.
Week 10	**Synchronization Lab** – Semaphores, mutexes, and solving producer-consumer and reader-writer problems.
Week 11	**Virtual Memory Lab** – Implementing simple page replacement algorithms (FIFO, LRU, Optimal).
Week 12	**Disk Scheduling Lab** – FCFS, SSTF, SCAN, and C-SCAN disk scheduling simulations.
Week 13	**System Calls Lab** – Using system calls for process control, file operations, and I/O management.
Week 14	**Advanced Topics Lab** – Case study on operating system features (e.g., Linux/Windows),

	security basics, or project work.
Week 15	**Final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	**Silberschatz, A., Galvin, P. B., & Gagne, G.** *Operating System Concepts*, 10th Edition. Wiley, 2018.	
Recommended Texts	**Stallings, W.** *Operating Systems: Internals and Design Principles*. Pearson.	
Websites	**Microsoft Learn** – official technical training and documentation (includes OS fundamentals and related topics) https://learn.microsoft.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.