نموذج وصف البرنامج الأكاديمي

وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education & Scientific Research

جامعة كلكامش
GILGAMESH UNIVERSITY

اسم الجامعة: جامعة .كلكامش

الكلية/ المعهد: كلية الهندسة

القسم العلمي: قسم هندسة الحاسوب

اسم البرنامج الأكاديمي او المهني: بكالوريوس

اسم الشهادة النهائية: بكالوريوس في هندسة الحاسوب

النظام الدراسي: بولونيا

تاريخ اعداد الوصف:

التوقيع   :   التوقيع   :

اسم المعاون العلمي: اسم رئيس القسم:

التاريخ   :   التاريخ   :

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ   ١٢ /٨ /٥٠٠ ٢

التوقيع

مصادقة السيد العميد

1. رؤية البرنامج

يسعى القسم الى ان يكون رائدا في مجال الحاسوب ، ويساهم في اعداد كوادر يتميزون بالمهارة و الكفاءة وبما يتناسب مع احتياجات سوق العمل ، ويسعى القسم الى مواكبة التطورات التقنية والتكنولوجية في مجال الحاسوب وذلك من خلال قيامه بأعداد مهندسين اكفاء قادرين على خدمة المجتمع .

2. رسالة البرنامج

السعي لتحقيق اعلى درجات الاستفادة العلمية من خلال ربط الجانب العلمي بالجانب العملي في مجال هندسة الحاسوب ورفد الطلبة بالمهارات المطلوبة لمواكبة التطورات ومتطلبات سوق العمل .

3. اهداف البرنامج

يسعى قسم هندسة الحاسوب من خلال رؤيته ورسالته الى تحقيق الاهداف التالية :

الايفاء بمتطلبات سوق العمل واحتياجاته من خلال المقررات الدراسية .

اعداد كوادر هندسية مهنية ومتطورة قادرة على تصميم انظمة وبرامج الحاسوب و تحليلها و تطويرها .

تقديم الاستشارات الهندسية في مجال الحاسوب .

توفير بيئة علمية جيدة لكل من الطلبة والتدريسين لتحقيق مخرجات عالية الجودة .

التركيز على الجانب العملي والفني واعطاءه الكثير من الاهتمام من خلال توفير احدث المختبرات .

4. الاعتماد البرامجي

هل البرنامج حاصل على الاعتماد البرامجي ؟ ومن اي جهة ؟

5. المؤثرات الخارجية الأخرى

هل هناك جهة راعية للبرنامج ؟

6. هيكلية البرنامج

ملاحظات *	النسبة المئوية	وحدة دراسية	عدد المقررات	هيكل البرنامج
				متطلبات المؤسسة
				متطلبات الكلية
				متطلبات القسم
				التدريب الصيفي
				أخرى

* ممكن ان تتضمن الملاحظات فيما اذا كان المقرر أساسي او اختياري .

7. وصف البرنامج

الساعات المعتمدة		اسم المقرر أو المساق	رمز المقرر أو المساق	السنة / المستوى
عملي	نظري			
	2	الرياضيات 1	COE11301	المرحلة الاولى/ كورس اول
	2	الرسم الهندسي	COE11302	المرحلة الاولى/ كورس اول
2	2	منهجية برمجة الحاسوب	COE11303	المرحلة الاولى/ كورس اول
2	2	أساسيات النظام الرقمي	COE11304	المرحلة الاولى/ كورس اول
	2	اللغة الإنكليزية 1	GU133	المرحلة الاولى/ كورس اول
2	2	أساسيات الدوائر الكهربائية 1	COE11305	المرحلة الاولى/ كورس اول
	2	الديمقراطية وحقوق الإنسان	GU131	المرحلة الاولى/ كورس اول
2	2	فيزياء الكترونية	COE12302	المرحلة الاولى/ كورس ثاني
	3	الرياضيات 2	COE12301	المرحلة الاولى/ كورس ثاني
2		الورشة	COE12303	المرحلة الاولى/ كورس ثاني
2	2	أساسيات تركيب الحاسوب	COE12304	المرحلة الاولى/ كورس ثاني
2	2	أساسيات الدوائر الكهربائية 2	COE12305	المرحلة الاولى/ كورس ثاني
	2	اللغة العربية 1	GU132	المرحلة الاولى/ كورس ثاني
	2	جرائم نظام البعث في	GU234	المرحلة الثانية كورس اول

		العراق		
2	2	البرمجة الشيئية	COE21301	المرحلة الثانية كورس اول
2	2	الرياضيات الهندسية	COE21302	المرحلة الثانية كورس اول
2	2	أساسيات الاتصالات 1	COE21303	المرحلة الثانية كورس اول
2	2	تصميم النظم الرقمية 1	COE21304	المرحلة الثانية كورس اول
2	2	إلكترونيك 1	COE21306	المرحلة الثانية كورس اول
2	2	تحليلات هندسية	COE22301	المرحلة الثانية كورس ثاني
2	2	إلكترونيك 2	COE22302	المرحلة الثانية كورس ثاني
2	2	أساسيات الاتصالات 2	COE22303	المرحلة الثانية كورس ثاني
2	2	تصميم النظم الرقمية 2	COE22304	المرحلة الثانية كورس ثاني
	4	نظم التشغيل	COE22305	المرحلة الثانية كورس ثاني
	2	اللغة الانكليزية 2	GU232	المرحلة الثانية كورس ثاني
	2	اللغة العربية 2	GU231	المرحلة الثانية كورس ثاني
2	2	هياكل البيانات والخوارزميات	COE22306	المرحلة الثانية كورس ثاني
	2	الاحتمالية	COE31301	المرحلة الثالثة كورس اول
	2	هندسة البرمجيات	COE31302	المرحلة الثالثة كورس اول
2	2	تطوير الويب	COE31303	المرحلة الثالثة كورس اول
	2	الإشارات والأنظمة	COE31304	المرحلة الثالثة كورس اول
	2	معمارية الحاسوب 1	COE31305	المرحلة الثالثة كورس اول
2	2	المعالجات الدقيقة 1	COE31306	المرحلة الثالثة كورس اول
	2	تحليلات عددية	COE32301	المرحلة الثالثة/ كورس ثاني
2	2	نظم قواعد البيانات	COE32302	المرحلة الثالثة/ كورس ثاني
	2	معالجة الإشارة الرقمية	COE32303	المرحلة الثالثة/ كورس ثاني
	2	معمارية الحاسوب 2	COE32304	المرحلة الثالثة/ كورس ثاني
2	2	المعالجات الدقيقة 2	COE32305	المرحلة الثالثة/ كورس ثاني
2	2	شبكات الحاسوب	COE32306	المرحلة الثالثة/ كورس ثاني
2	2	الذكاء الاصطناعي	COE41301	المرحلة الرابعة/ كورس اول
2	2	نظم قواعد البيانات الموزعة	COE41302	المرحلة الرابعة/ كورس اول
2	2	معالجة الوسائط المتعددة الرقمية	COE41303	المرحلة الرابعة/ كورس اول
2	2	الأنظمة المدمجة	COE41304	المرحلة الرابعة/ كورس اول
2	2	أنظمة السيطرة	COE41305	المرحلة الرابعة/ كورس اول

	1	مشروع التخرج	COE41306	المرحلة الرابعة/ كورس اول
2	2	الحوسبة اللينة 2	COE42301	المرحلة الرابعة/ كورس اول
	2	أمن الحاسوب	COE42302	المرحلة الرابعة/ كورس ثاني
2	2	نظم السيطرة الرقمية	COE42303	المرحلة الرابعة/ كورس ثاني
	2	إدارة المشاريع	COE42304	المرحلة الرابعة/ كورس ثاني
	2	المعالجة المتوازية	COE42305	المرحلة الرابعة/ كورس ثاني
	1	مشروع التخرج	COE42306	المرحلة الرابعة/ كورس ثاني

8. مخرجات التعلم المتوقعة للبرنامج	
المعرفة	
مخرجات التعلم 1	بيان نتائج التعلم 1
المهارات	
مخرجات التعلم 2	بيان نتائج التعلم 2
مخرجات التعلم 3	بيان نتائج التعلم 3
القيم	
مخرجات التعلم 4	بيان نتائج التعلم 4
مخرجات التعلم 5	بيان نتائج التعلم 5

9. استراتيجيات التعليم والتعلم
استراتجيات وطرائق التعليم والتعلم المعتمدة في تنفيذ البرنامج بشكل عام .

10. طرائق التقييم
تنفيذها في جميع مراحل البرنامج بشكل عام .

11. الهيئة التدريسية
أعضاء هيئة التدريس

الرتبة العلمية	التخصص		المتطلبات/المهارات الخاصة (ان وجدت)	اعداد الهيئة التدريسية	
	عام	خاص		ملاك	محاضر

التطوير المهني
توجيه أعضاء هيئة التدريس الجدد
تصف بإيجاز العملية المستخدمة لتوجيه أعضاء هيئة التدريس الجدد والزائرين والمتفرغين وغير المتفرغين على مستوى المؤسسة والقسم.
التطوير المهني لأعضاء هيئة التدريس
تصف بإيجاز خطة وترتيبات التطوير الأكاديمي والمهني لأعضاء هيئة التدريس كاستراتيجيات التدريس والتعلم، وتقييم نتائج التعلم، التطوير المهني وما الى ذلك.

12.   معيار القبول
(وضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد سواء قبول مركزي او أخرى تذكر)

13.   أهم مصادر المعلومات عن البرنامج
تذكر بصورة مختصرة .

14.   خطة تطوير البرنامج

السنة / المستوى	رمز المقرر	اسم المقرر	اساسي أم اختياري	المعرفة				المهارات				القيم			
				أ1	أ2	أ3	أ4	ب1	ب2	ب3	ب4	ج1	ج2	ج3	ج4
المرحلة الاولى/ كورس اول	COE11301	الرياضيات 1	اساسي												
المرحلة الاولى/ كورس اول	COE11302	الرسم الهندسي	اساسي												
المرحلة الاولى/ كورس اول	COE11303	منهجية برمجة الحاسوب	اساسي												
المرحلة الاولى/ كورس اول	COE11304	أساسيات النظام الرقمي	اساسي												
المرحلة الاولى/ كورس اول	GU133	اللغة الإنكليزية 1	اساسي												
المرحلة الاولى/ كورس اول	COE11305	أساسيات الدوائر الكهربائية 1	اساسي												

مخطط مهارات البرنامج

مخرجات التعلم المطلوبة من البرنامج

													اساسي	الديمقراطية وحقوق الإنسان	GU131	المرحلة الاولى/ كورس اول
													اساسي	فيزياء الكترونية	COE12302	المرحلة الاولى/ كورس ثاني
													اساسي	الرياضيات 2	COE12301	المرحلة الاولى/ كورس ثاني
													اساسي	الورشة	COE12303	المرحلة الاولى/ كورس ثاني
													اساسي	أساسيات تركيب الحاسوب	COE12304	المرحلة الاولى/ كورس ثاني
													اساسي	أساسيات الدوائر الكهربائية 2	COE12305	المرحلة الاولى/ كورس ثاني
													اساسي	اللغة العربية 1	GU132	المرحلة الاولى/ كورس ثاني
													اساسي	جرائم نظام البعث في العراق	GU234	المرحلة الثانية كورس اول

														اساسي	البرمجة الشيئية	COE21301	المرحلة الثانية كورس اول
														اساسي	الرياضيات الهندسية	COE21302	المرحلة الثانية كورس اول
														اساسي	أساسيات الاتصالات 1	COE21303	المرحلة الثانية كورس اول
														اساسي	تصميم النظم الرقمية 1	COE21304	المرحلة الثانية كورس اول
														اساسي	إلكترونيك 1	COE21306	المرحلة الثانية كورس اول
														اساسي	تحليلات هندسية	COE22301	المرحلة الثانية كورس ثاني
														اساسي	إلكترونيك 2	COE22302	المرحلة الثانية كورس ثاني
														اساسي	أساسيات الاتصالات 2	COE22303	المرحلة الثانية كورس ثاني
														اساسي	تصميم النظم الرقمية 2	COE22304	المرحلة الثانية كورس ثاني

																	ثاني
											اساسي	نظم التشغيل	COE22305	**المرحلة الثانية كورس ثاني**
											اساسي	اللغة الانكليزية 2	GU232	**المرحلة الثانية كورس ثاني**
											اساسي	اللغة العربية 2	GU231	**المرحلة الثانية كورس ثاني**
											اساسي	هياكل البيانات والخوارزميات	COE22306	**المرحلة الثانية كورس ثاني**
											اساسي	الاحتمالية	COE31301	**المرحلة الثالثة كورس اول**
											اساسي	هندسة البرمجيات	COE31302	**المرحلة الثالثة كورس اول**
											اساسي	تطوير الويب	COE31303	**المرحلة الثالثة كورس اول**
											اساسي	الإشارات والأنظمة	COE31304	**المرحلة الثالثة كورس اول**

															اساسي	معمارية الحاسوب 1	COE31305	المرحلة الثالثة كورس اول
																اساسي	المعالجات الدقيقة 1	COE31306	المرحلة الثالثة كورس اول
																اساسي	تحليلات عددية	COE32301	المرحلة الثالثة/ كورس ثاني
																اساسي	نظم قواعد البيانات	COE32302	المرحلة الثالثة/ كورس ثاني
																اساسي	معالجة الإشارة الرقمية	COE32303	المرحلة الثالثة/ كورس ثاني
																اساسي	معمارية الحاسوب 2	COE32304	المرحلة الثالثة/ كورس ثاني
																اساسي	المعالجات الدقيقة 2	COE32305	المرحلة الثالثة/ كورس ثاني
																اساسي	شبكات الحاسوب	COE32306	المرحلة الثالثة/ كورس ثاني
																اساسي	الذكاء الاصطناعي	COE41301	المرحلة الرابعة/ كورس

																	اساسي			اول
																	اساسي	نظم قواعد البيانات الموزعة	COE41302	المرحلة الرابعة/ كورس اول
																	اساسي	معالجة الوسائط المتعددة الرقمية	COE41303	المرحلة الرابعة/ كورس اول
																	اساسي	الأنظمة المدمجة	COE41304	المرحلة الرابعة/ كورس اول
																	اساسي	أنظمة السيطرة	COE41305	المرحلة الرابعة/ كورس اول
																	اساسي	مشروع التخرج	COE41306	المرحلة الرابعة/ كورس اول
																	اساسي	الحوسبة اللينة 2	COE42301	المرحلة الرابعة/ كورس اول
																	اساسي	أمن الحاسوب	COE42302	المرحلة الرابعة/ كورس ثاني
																	اساسي	نظم السيطرة	COE42303	المرحلة الرابعة/ كورس

																	المادة	رمز المادة	
																		الرقمية		ثاني
																اساسي	إدارة المشاريع	COE42304	المرحلة الرابعة/ كورس ثاني
																اساسي	المعالجة المتوازية	COE42305	المرحلة الرابعة/ كورس ثاني
																اساسي	مشروع التخرج	COE42306	المرحلة الرابعة/ كورس ثاني

● **يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم**

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td><strong style="color:red">Electrical Circuits Analysis</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">B</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☒ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center"><strong style="color:red">COE111</td></tr>
<tr><td>ECTS Credits</td><td align="center">6</td></tr>
<tr><td>SWL (hr/sem)</td><td align="center"><strong style="color:red">150</td></tr>
<tr><td>Module Level</td><td>UG1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td></td><td>College</td><td></td></tr>
<tr><td>Module Leader</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Module Leader's Acad. Title</td><td></td><td>Module Leader's Qualification</td><td></td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td></td><td>Version Number</td><td></td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the concepts of basic electrical elements, sources, and electrical network configurations. Also, to understand how the electrical elements such as resistors, capacitors, and inductors are construct a simple and complex electrical network configuration 2. To develop problem solving skills through different solving techniques. 3. The course deals with the basic concept of electrical circuit theories, rules methods analysis (Ohm Law, Kirchhoff's Laws, Thevenin, Norton, Superposition, Mesh analysis, maximum power transfer, etc.)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning standard measurement units used in electrical networks, 2. study the nature of electricity of materials in term of conductivity and resistivity of materials and how it divided into the conductor, insulator, and semiconductor elements. 3. Define electrical power, charge, voltage, current, resistors, capacitors, inductors, and electrical energy. 4. Study and analysis different types of circuit connections (series, parallel, delta, star, and complex configuration). 5. Discuss dependent and independent electrical source (voltage and current). 6. Define Ohm's law and explain its importance in electric and electronic circuit analysis. 7. Explain Kirchhoff voltage law (KVL) and Kirchhoff current law (KCL) that it is used in electric network analysis. 8. Study and explain in details various theorems and techniques used in electrical circuit analysis (superposition, Nodal analysis, Mesh, Thevenin, Norton theorem, and maximum power transfer) 9. study capacitor sand inductors properties and their circuit configurations. 10. Discuss alternating current and voltage waveforms AC sinusoidal waveforms in term of mean, effective values and phasors diagrams in an electric circuit. 11. Repeat various techniques used in solving electrical circuits exceed by ac sources.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. DC part: standard units used in electrical circuits, Charge, Current and voltage definitions, Passive electric components (R, C, and L), series and parallel connections, sources conversions. [20 hrs.] Della to star and star to delta conversion, Ohm's law, power, energy, and Kirchhoff's laws. [20]

	Methods of analysis (Source Conversions, Mesh analysis, Nodal analysis, superposition theorem, Thévenin's theorem, Norton's Theorem, and maximum power transfer theorem) [30].
	Capacitors and Inductors (introduction, properties, and configurations) [10 hrs.]
	AC part: Sinusoidal Ac Voltage Characteristics and Definitions, average value, effective value (rms value). [10 hrs.]
	Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [20 hrs.]
	AC Circuits II - Phasor diagrams, complex impedance, AC circuit with complex numbers. [10 hrs.]
	Series-Parallel Ac Networks, Methods of Analysis of AC networks (Source Conversions, Mesh analysis, Nodal analysis, superposition theorem, Thévenin's theorem, Norton's Theorem, and maximum power transfer theorem) [20 hrs.]
	Revision problem class [10hrs]
	.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Teaching strategies adopted in electrical circuit analysis class encourage students to understanding basic electrical components (R, C, and L) properties and electric ac and dc sources used in supplying different electric networks. Also, expanding their problem solving skills. Also, help them to improve skills in discovering electrical systems fault diagnosis. This will be achieved through classes, interactive tutorials and by considering types 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	100	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Electrical Circuit Elements And Variables
Week 2	Ohm's law, electrical power, energy, and efficiency
Week 3	Resistance Series and Parallel Networks. Current and Voltage Divider Rules.
Week 4	Kirchhoff's Laws (KVL and KCL)
Week 5	Sources Conversions and Δ To Y Transformations
Week 6	Loop Current Method (Mesh Analysis) and Nodal Analysis
Week 7	Thévenin's and Norton's Theorems
Week 8	Superposition Theorem
Week 9	Maximum Power Transfer Theorem
Week 10	Introduction to Sinusoidal Ac Waveforms (Characteristics and Definitions).
Week 11	Average and Rms Waveforms Values. Response of Basic R, L, And C Elements to A Sinusoidal Voltage Or Current.
Week 12	Series and Parallel Ac Circuits and Power Factor
Week 13	Methods of AC circuit analysis I

Week 14	Methods of AC circuit analysis II
Week 15	Inductor and capacitor circuits
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Lab 1: resistance measurement (color code and mustimeter method)
Week 2	Lab 2: Ohms Law
Week 3	Lab 3: Resistance Series and Parallel Networks.
Week 4	Lab 4: Kirchhoff's Laws (KVL and KCL).
Week 5	Lab 5: Δ To Y Transformations
Week 6	Lab 6: Superposition Theorem
Week 7	Lab 7:Thévenin's Theorems.
Week	Lab 8: Norton's Theorems.
Week 9	Lab 9:Maximum Power Transfer Theorem
Week 10	Lab 10:Characteristics of Sinusoidal Ac Waveforms
Week 11	Lab 11: Series and Parallel Ac Circuits
Week12	Lab12: Series and Parallel Capacitors.
Week13	Lab13: Series and Parallel Inductor Circuits
Week14	Lab14: Transient in Capacitance Networks and Time Constant
Week15	Lab15: R-L Transient and Time Constant

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	R.L, Boylestad " Introductory Circuit analysis 5th edition. Merrill publishing company	Yes
Recommended Texts	Charles Alexander, "Fundamentals of Electric Circuits" 5TH Edition, Publisher: McGraw-Hill Publishing Company, 2013.	yes
Websites	https://www.coursera.org/browse/physical-sience-and-engineering/electronic	

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

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Mathematics I</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Basic Learning Activity</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>COE112</td></tr>
<tr><td>ECTS Credits</td><td>5</td></tr>
<tr><td>SWL (hr/sem)</td><td>125</td></tr>
<tr><td>Module Level</td><td>UGI</td><td>Semester of Delivery</td><td></td></tr>
<tr><td>Administering Department</td><td></td><td>College</td><td></td></tr>
<tr><td>Module Leader</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Module Leader's Acad. Title</td><td></td><td>Module Leader's Qualification</td><td></td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td></td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

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

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills of Pre-differential calculus. 2. To understand Derivative as a Function. 3. To get a good grip on the Rules of differentiation. 4. To have a full grasp of the differentiation methods. 5. To be able to deal with Interpretations of the derivative.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize several aspects about Real Numbers System. 2. Being able to deal with parts of the Cartesian Coordinates System. 3. List the various terms associated with Functions. 4. Identify different types of functions. 5. Evaluating Limit for various types of Functions. 6. Testing for the continuity of Functions. 7. Evaluate the derivative of a function using the Definition. 8. Discuss the Rules of differentiation. 9. Map several functions to their derivatives. 10. Describe different differentiation methods. 11. Analyze the Tangent Line Slope using derivative. 12. Discuss the Rate of Change in the real-world using derivative. 13. Explain the Position, Velocity, and Acceleration using derivative. 14. Identify when it is worthy using L'Hopital Rule for evaluating a limit of a function. 15. Use the derivative to find Taylor and Maclaurin Series expansion of a function.
Indicative Contents المحتويات الإرشادية	**Part A – Pre Differential Calculus.** This part will include a Review of Real Numbers System in terms of Intervals, Inequalities, Absolute Value. After that, the Cartesian Coordinates System Increment, Distance, Straight Line Equation, Circle Equation. Furthermore, the Functions characteristics domain, Range, odd, even, and then its Types {Polynomial, Algebraic, Transcendental Functions (Exponential, Logarithmic, Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic)}. Finally, the Limit and Continuity of Functions is explained (Theorems on Limit "Calculation Techniques", One-Sided and Two-Sided Limit, Limit at infinity, Theorems on Limit at infinity, Some special limits, Conditions of Continuity.) [12 hrs] Revision problem tutorial sessions [6 hrs] **Part B – Differential Calculus.** This part will discuss the first key part of the semester namely Differentiation starting from defining the derivative based on the limit, to Calculating the Derivatives from this Definition, doing to explaining the rules of differentiation (Constant, Powers of a function, Constant Multiple, Summation of Functions, Product of Two Functions, Quotient of Two Functions.) Furthermore, functions under focus and their Derivatives will be demonstrated, followed by differentiation methods namely Implicit, Logarithmic, and chain rule. [8 hrs] Revision problem tutorial sessions [4 hrs]

	Part C – Interpretations of the derivative.
	This part will take the knowledge provided in part B and employ it to a meaningful Interpretations of the derivative {Slope of the Tangent Line, Rate of Change, (Position, Velocity, and Acceleration), L'Hopital Rule, Taylor and Maclaurin Series.} [10 hrs] Revision problem tutorial sessions [5 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The primary approach for presenting this module will be encouraging students to participate in the activities, as well as enhancing and improving their critical thinking abilities. This will be accomplished through lectures, tutorials, debates, and assessing activities.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 11	LO #1 - #4 and #5 - #10
	Assignments	2	5% (5)	6 and 13	LO #1 - #5 and #6 - #12
	Projects / Lab.	N/A	N/A	N/A	
	Report	N/A	N/A	N/A	
Summative assessment	Midterm Exam	2hr	20% (20)	8	LO #1 - #7
	Final Exam	3hr	70% (70)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Review of Real Numbers System (**Intervals, Inequalities, Absolute Value.**)**
Week 2	**Cartesian Coordinates System (**Increment, Distance, Straight Line Equation, Circle Equation.**)**
Week 3	**Functions (**Domain, Range, odd, even, Types {Polynomial, Algebraic}.**)**
Week 4	**Functions (**Types {Transcendental Functions (Exponential, Logarithmic, Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic)}.**)**
Week 5	**Limit and Continuity of Functions (**Theorems on Limit "Calculation Techniques", One-Sided and Two-Sided Limit.**)**
Week 6	**Limit and Continuity of Functions (**Limit at infinity, Theorems on Limit at infinity, Some special limits, Conditions of Continuity.**)**
Week 7	**Differentiation (**Derivative as a Function, Calculating Derivatives from the Definition.**)**
Week 8	**Differentiation (**Rules of differentiation {Constant, Powers of a function, Constant Multiple, Summation of Functions, Product of Two Functions, Quotient of Two Functions}.**)**
Week 9	**Differentiation (**Functions and their Derivatives, Implicit differentiation.**)**
Week 10	**Differentiation (**Logarithmic differentiation, chain rule.**)**
Week 11	**Interpretations of the derivative (**Slope of the Tangent Line.**)**
Week 12	**Interpretations of the derivative (**Rate of Change.**)**
Week 13	**Interpretations of the derivative (**Position, Velocity, and Acceleration.**)**
Week 14	**Interpretations of the derivative (**L'Hopital Rule.**)**
Week 15	**Interpretations of the derivative (**Taylor and Maclaurin Series.**)**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي للدرس التدريبي

	Material Covered
	Each weak a questions sheet will be solved and discussed related to the material covered in the theoretical lecture.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Joel R. Hass, Christopher E. Heil, Maurice D. Weir, "Thomas' Calculus: Early Transcendentals", Pearson Education, 14th Edition, (January 1, 2017), ISBN-13 : 978-0134439020.	Yes
Recommended Texts	Anthony Croft, Robert Davison, "Mathematics for Engineers: A Modern Interactive Approach", Prentice Hall, 3rd edition, (January 1, 2008), ISBN-13 : 978-0132051569.	No
Websites	https://www.khanacademy.org/math/differential-calculus	

| Grading Scheme |||||
| مخطط الدرجات |||||
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

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<tr><td colspan="4" align="center">Module Information
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<tr><td>Module Title</td><td align="center">Logic Circuits Design</td><td>Module Delivery</td><td></td></tr>
<tr><td>Module Type</td><td align="center">Core</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☒ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center">COE113</td></tr>
<tr><td>ECTS Credits</td><td align="center">6</td></tr>
<tr><td>SWL (hr/sem)</td><td align="center">150</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td></td><td>College</td><td></td></tr>
<tr><td>Module Leader</td><td></td><td>e-mail</td><td></td></tr>
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<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

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

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of logic circuit design methodology. 2. To familiarize students with the core ideas of Boolean algebra and how it is used in digital logic circuits. 3. The course deals with the basic concept of logic circuits. 4. The course is the building block for Computer Architecture course. 5. To understand how to design combinational logic circuits. 6. To understand and apply optimization algorithms to design logic circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Differentiate between analog and digital quantities. 2. Appreciate the power of using binary number system. 3. Realize the importance of digital codes. 4. Realize the importance of the abstraction provided by logic gates. 5. Use Boolean algebra to analyze and simplify logic circuits. 6. Use simulation of logic circuits. 7. Use Karnaugh map to optimize the Boolean expressions. 8. Grasp the concept of Don't care and understand why Quine–McCluskey method is more suitable than Karnaugh map for simplifying more than four variables Boolean equations. 9. Apply systematic procedure to solve some of the digital design problems. 10. Utilize Verilog to verify the logic circuit design. 11. Understand universal gates properties and how to utilize these gates in the logic circuit implementation. 12. Understand how to implement arithmetic for computers. 13. Understand how to expand an existence design to solve bigger problems. 14. Understand how to reduce propagation delay. 15. Utilize algorithmic thinking to simplify the design of a digital system.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Introduction to Digital Logic Design, Number Systems and Codes Introduction to digital systems - Digital and analog quantities, binary digits, logic levels, digital waveforms, overview of basic logic functions, fixed-function integrated circuits, introduction to programmable logic, digital system application, positional number system, decimal numbers, binary numbers, number-base conversions, binary arithmetic, complements of numbers, signed binary numbers, arithmetic operation with signed binary numbers , hexadecimal numbers, octal numbers, binary coded decimal(BCD), digital codes. [6 hrs] Logic Gates and Boolean Algebra

	Review of AND, OR and NOT gates, NAND, NOR, EX-OR, EX-NOR, introduction to Hardware Description Languages (HDL), Boolean operation and expressions, laws and rules of Boolean algebra, De Morgan's Theorems, Boolean analysis of logic circuits, simplification using Boolean algebra, canonical and standard forms of Boolean expressions, Boolean expression and truth tables, developing Verilog model for logic circuits, gate delays, the Karnaugh Map, prime implicant and essential prime implicant, Karnaugh map minimization, don't care Conditions, Quine–McCluskey method. [10 hrs] Combinational Logic Analyses Basic combinational logic circuits, design procedure, implementing combinational logic, Verilog models of combinational logic circuits, code conversion, the universal property of NAND and NOR gates, Combinational logic using NAND gates only and NOR gates only. [6 hrs] Combination Logic Circuit Applications Half Adder, full Adder, half Subtractor, full Subtractor, parallel Binary adders and parallel Binary subtractors, 4-bit subtractor using 4-bit Adder, The Adder – Subtractor circuit, adder expansion, carry lookahead adder, decimal adder, parity generation and checking, magnitude comparator. [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	These learning and teaching strategies aim to create an engaging and interactive learning environment. We summarize them below: 1. **Lectures:** the instructor will present in-class lectures to introduce and clarify important concepts, theories, and principles related to the design of digital logic circuits. 2. **Interactive Discussions**: Engaging students in interactive discussions to encourage critical thinking. 3. **Hands-on Laboratory Work**: students gain practical experience in a controlled environment to reinforce theoretical concepts. 4. **Group Projects:** Assigning group projects that require students to collaborate and work together to solve logic circuit design problems. This promotes teamwork, communication, and division of tasks. 5. **Simulations and Virtual Labs**: Utilizing simulation software and virtual labs to provide students with virtual hands-on experiences when physical resources are limited. 6. **Use of Visuals and Multimedia:** Incorporating visual aids, multimedia resources, and interactive tools can enhance understanding and engagement.

7. **Assessment and Feedback**: Regular assessments, including quizzes, tests, and examinations to show how well the students understand the subject.
8. **Practice and Revision Sessions**: Providing dedicated practice sessions and revision classes enables them to improve students' comprehension and strengthen their information.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٩٣	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٥٧	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	2	10% (10)	6 and 12	LO #1- #5 and #6 - #11
	Assignments	2	10% (10)	3 and 12	LO #2 and #5, #7, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5 - #13
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	Introduction to digital and analog quantities, integrated circuits, and digital system applications
Week 2	Number-base conversions, binary arithmetic, octal and hexadecimal numbers, complements of numbers

Week 3	Signed numbers, arithmetic operation with signed binary numbers, BCD, digital codes
Week 4	Review of AND, OR and NOT gates, NAND, NOR, XOR, XNOR, introduction to Hardware HDL, Boolean operation and expressions, laws and rules of Boolean algebra, De Morgan's Theorems
Week 5	Boolean analysis of logic circuits, simplification using Boolean algebra, canonical and standard forms of Boolean expressions, Boolean expression, and truth tables
Week 6	developing Verilog model for logic circuits, gate delays
Week 7	Karnaugh Map, prime implicant and essential prime implicant, Karnaugh map minimization
Week 8	Midterm exam + don't care conditions, Quine–McCluskey method
Week 9	Basic combinational logic circuits, design procedure, implementing combinational logic
Week 10	Verilog models of combinational logic circuits, code conversion
Week 11	the universal property of NAND and NOR gates, Combinational logic using NAND gates only and NOR gates only
Week 12	Half Adder, full Adder, half Subtractor, full Subtractor
Week 13	parallel Binary adders and parallel Binary subtractors, 4-bit subtractor using 4-bit Adder, The Adder – Subtractor circuit, adder expansion
Week 14	carry lookahead adder, decimal adder
Week 15	Odd and Even functions, Parity generation and checking, magnitude comparator
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered	
Week 1	Lab 1: Introduction to the lab kits.	
Week 2	Lab 2: NOT, AND, OR gates implementation using kit	
Week 3	Lab 3: NAND, NOR, EX-OR, EX-NOR gates	
Week 4	Lab 4: Rules of Boolean algebra (implementation using kit)	
Week 5	Lab 5: Universal gates and De Morgan's Theorems (implementation using kit)	
Week 6	Lab 6: SOP (implementation using kit)	
Week 7	Lab7: POS (implementation using kit)	
Week 8	Lab 8: Karnaugh Map (implementation using kit)	
Week 9	Lab 9: Karnaugh Map + don't care condition (implementation using kit)	

Week 10	Lab 10: Binary to Gray code, and Gray code to Binary (implementation using kit)
Week 11	Lab 11: BCD to Excess-3 Code Conversion (implementation using kit)
Week 12	Lab 12: Adders (implementation using Kit)
Week 13	Lab 13: Adders (implementation using Logisim)
Week 14	Lab 14: Subtractors (implementation using kit)
Week 15	Lab 15: Subtractors (implementation using Logisim)

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1-Digital Design with an Introduction to the Verilog, HDL, VHDL and System Verilog, Sixth edition, M. Morris Mano, Michael D. Ciletti, 2019.	NO
	2-Digital fundamentals, Eleventh Edition, Thomas L. Floyd, 2015.	NO
Recommended Texts		
Websites	https://www.coursera.org/learn/digital-systems	

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

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Academic English**	**Module Delivery**	
Module Type	**Secondary**	☒ Theory	
Module Code	COE115	☐ Lecture	
ECTS Credits	2.00	☒ Tutorial	
SWL (hr/sem)	**75**	☐ Practical ☐ Seminar	
Module Level	1	**Semester of Delivery**	1
Administering Department		**College**	
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Nowadays English has a special and predominant role in the communicative sphere of the world. It also has a special identity in the field of education. This module aims to enhance both the verbal and written communication skills of students. The aim requires a particular focus on the development of the basic language skills (speaking, listening, reading and writing) and on broadening students' vocabulary and syntactical range so that they can communicate easily on a wide range of topics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This semester will help students through enhancing their knowledge and understanding and enabling them to use grammar correctly, analyze the element of language and establish the appropriate relationship among linguistic components, in addition to understanding the meaning of sentences and paragraphs. So the learning outcomes will be: 1. The course covers the core language skills that students need to communicate successfully in technical specializations. 2. Enable students to give their opinions and participate in discussions on a wide range of English topics. 3. The ability to communicate effectively in written format on a range of contemporary topics, especially technical ones. 4. Understanding the key points of a range of moderately complex oral and written texts with relative ease. 5. Communicating effectively as part of a multicultural and international group. 6. Expressing meaning and using different vocabularies through the use of digital technology.
Indicative Contents المحتويات الإرشادية	**A- Communicative competences** - **Listening** - Understand and identify the main points of dialogues on familiar topics regularly encountered in life, work, school, etc., within the scope of the curriculum. - Listen and guess meanings (through the expressions and feelings of the speakers) in familiar monologues and conversations in everyday life - Understand the main points of news programs, broadcasts, interviews, etc., on familiar topics which are clearly delivered in simple language, or with illustrative images. - **Speaking** - Pronounce clearly and relatively accurately short dialogues. - Speak and interact with fellow speakers about familiar topics, express personal views and exchange information about the topics covered in the curriculum. - Describe in simple discourse familiar topics, narrate a short story closely related to the topics covered. - Present preparedly the projects on the topics in the curriculum. - **Reading** - Read and comprehend the main points, specific contents of a text of 200 words on current and familiar topics. - Read and understand

the argument flow of texts, identify main conclusions in texts using clear language.

- **Writing** – write paragraphs (block and indented styles), Write simple connected and coherent texts; write short reports based on suggestions, providing factual information and reasons for the recommendations made in the reports; collect short information from several sources and summarize it. Write descriptive texts of simple charts and tables.

B- **Linguistic knowledge**

- **Pronunciation**: Vowel and consonant syllable, words with different syllables, Words with stress (specials cases) – Words without stress, Sentence stress, assimilation, linking vowels with vowels Question, intonation, Homophones, practicing words and terms, phrases, and sentences related to the students' major.
- **Vocabulary**: Words related to themes and topics of the course, collocations, words with different meanings, and pronunciations.
- **Grammar**: parts of speech, past, Present, and future tenses, Word structure (compound nouns), Countable and uncountable nouns. Types on sentences: simple, compound, complex sentences, Articles, language function: commands, requests, offers, advice and instructions. Modal verbs, Relative pronouns and Relative clauses with which-that-who-whom-whose-where-when. Prepositions, Phrasal verbs (including verbs, adverbs and prepositions), comparison showing changing things, Sentences of reason and results and Conjunctions: although, however etc, active and passive, Adverbial clauses of condition, Comparatives and superlatives of adjectives.

	Learning and Teaching Strategies استراتيجيات التعلم والتعليم
Strategies	The teacher should prepare his/her students for listening to academic lectures and academic reading to some extent. In addition to that, students should participate in the lecture through the skills of speaking, writing , reading and listening **Students are taught by Communicative language teaching (CLT),** in which students are encouraged to communicate with each other in the target language. Students need to be exposed to the target language as much as possible to understand and use the target language in real-life situations. A variety of ways will be used to teach students Technical English. A. Working in groups. B. Class Discussions. C. Presentation to get students to communicate with each other in the target language and to practice using the target language for communication. D. Visual by the use of pictures, images, and spatial understanding.

	E. Aural (auditory-musical) by using sound and music.
	F. Verbal (linguistic), using words, both in speech and writing.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1 and #4
	Assignments	2	10% (10)	2 and 12	LO #3, #4, and #6
	Project / presentation	1	10% (10)	14	All
	Report	1	10% (10)	15	All except #5
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1, #3, and #4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	• **An introduction** • **Parts of speech(nouns-verbs-adjectives-adverbs-prepositions-articles-pronouns-conjunctions-interjections)** • **Unit One of the book (Headway)**

Week 2	• **The components, structure and kinds of the sentences**
	   - **Simple-compound –complex**
	   - **Declarative- interrogative –exclamatory – conditional –imperative**
	• **Unit Two (Headway)**

Week 3	• **Tenses (present, past and future)**
Week 4	• **Reading Skills and how to make skimming, scanning and intensive reading (Passage)** • **Unit Three (Headway)**
Week 5	• **Writing Skills (Punctuation – ways to join sentences- principles of paragraph structure)** • **Unit Four (Headway)**
Week 6	• **Passive and active sentences in scientific writing.** • **Unit Five (Headway)**
Week 7	**Mid-term Exam**
Week 8	• **Listening skills- How to participate in different topics- how to avoid silence** • **How to answer the questions of the passage in exam (WH Questions)** • **Unit Six (Headway)**
Week 9	• **Reading skills (Passage)** • **Unit Seven + unit Eight (Headway)**
Week 10	• **Idioms and idiomatic expression** • **Unit Nine (Headway)**
Week 11	• **Written Conversation in English** • **Unit Ten (headway)**
Week 12	• **Phrasal verbs** • **Unit Eleven (Headway)**
Week 13	• **Conditional in English** • **Speaking skills (how to make presentation)** • **Unit Twelve (Headway)**
Week 14	• **Presentations**
Week 15	• **Unit thirteen + unit fourteen (headway)**
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	1- New Headway Plus for Beginners, English Course, John and Liz Soars.(4th edition). Oxford University Press. 2- Santiago Remacha Esteras. (2007). Infotech: English for Computer Users. (4th edition). Cambridge.	Yes
Recommended Texts	Murphy, R. (1985). English Grammar in Use. Cambridge.	No
Websites	Randall's ESL Cyber Listening Lab - English Listening	

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

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2"><strong style="color:red">Engineering Drawing and AutoCAD</td><td rowspan="4">Module Delivery
⊠ Theory
⊠ Lecture
⊠ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Type</td><td colspan="2">Core</td></tr>
<tr><td>Module Code</td><td colspan="2"><strong style="color:red">COE114</td></tr>
<tr><td>ECTS Credits</td><td colspan="2">6</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2"><strong style="color:red">150</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td></td></tr>
<tr><td>Module Leader</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Module Leader's Acad. Title</td><td></td><td>Module Leader's Qualification</td><td></td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td></td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Creating accurate and detailed technical drawings: AutoCAD enables users to produce precise 2D drawings with accurate dimensions, annotations, and symbols. It allows for the creation of technical drawings that can be used for construction, manufacturing, or documentation purposes. 2. Designing 3D models: AutoCAD supports the creation of three-dimensional models of objects, structures, or products. Users can visualize and analyze designs in 3D, enhancing their understanding of spatial relationships and enabling better communication of design intent. 3. Streamlining the design process: AutoCAD offers features like parametric design, which allows for easy modification of designs by changing parameters. It also provides tools for automating repetitive tasks and customizing the software to suit specific workflows, reducing manual effort and increasing efficiency. 4. Collaborating and sharing designs: AutoCAD enables collaboration among team members by facilitating the sharing of drawings, allowing for markups, and tracking revisions. It supports interoperability with other software applications, enabling seamless exchange of design data. 5. Generating presentation and visualization materials: AutoCAD includes rendering capabilities to create realistic visual representations of designs. Users can generate high-quality renderings, animations, and walkthroughs for presentations or marketing purposes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Proficiency in creating 2D drawings: Users will learn how to create accurate and detailed 2D drawings using AutoCAD. This includes skills in drawing lines, shapes, dimensions, annotations, and symbols. 2. Ability to design in 3D: AutoCAD enables users to create three-dimensional models of objects and structures. Users will develop the skills to design and manipulate 3D objects, apply materials, add textures, and set up lighting for enhanced visual representation. 3. Understanding of parametric design principles: AutoCAD offers parametric design capabilities, allowing users to associate parameters and constraints with design elements. Users will learn how to create intelligent designs that can be easily modified by adjusting parameters. 4. Proficiency in using drafting tools and commands: AutoCAD provides a wide range of tools and commands for drafting and editing. Users will gain proficiency in using these tools to accurately create, modify, and organize elements within a drawing. 5. Visualization and rendering skills: AutoCAD includes rendering capabilities that allow users to generate realistic visual representations of their designs. Users will learn how to apply materials, set up lighting, and create high-quality renderings for presentations or visualization purposes.

Indicative Contents المحتويات الإرشادية	1. Introduction to AutoCAD:
	  - Overview of AutoCAD and its applications
	  - User interface and navigation
	  - Drawing and editing tools

	2. Basic 2D Drawing:
	- Creating basic shapes (lines, circles, rectangles, etc.)
	- Modifying objects (trimming, extending, filleting, etc.)
	- Adding annotations and dimensions
	3. Advanced 2D Drawing:
	- Working with layers and layer properties
	- Creating and using blocks and attributes
	- Advanced editing commands (offset, array, mirror, etc.)
	4. Project Work and Case Studies:
	- Applying AutoCAD skills to complete real-world projects.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to AutoCAD- Overview of AutoCAD and its interface
Week 2	Object Properties Layers and layer properties Applying colors, linotypes, and line weights Managing object properties
Week 3	Text and Annotations Adding and formatting text in drawings Creating and editing dimensions Using dimension styles and tolerances
Week 4	Drawing Basics- Creating lines.
Week 5	Drawing Basics- Creating arcs.
Week 6	Drawing Basics- Creating circles.
Week 7	Drawing Basics- Creating POLYLINE
Week 8	Drawing Basics- Creating ELLIPSE
Week 9	Drawing Basics- Creating POLYGON
Week 10	Drawing Basics- Creating RECTANGLE
Week 11	Modify Tools- Copy (cp) or (co), Mirror (mi)& Offset (o)
Week 12	Modify Tools- Array (ar), Move (m) &Scale (sc)
Week 13	Modify Tools- Stretch (s), Trim (tr)& Extend (ex)
Week 14	Modify Tools- Break (br) ,Join (j), Chamfer (cha) & Fillet (f)
Week 15	Review for over all
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Creating- lines.

Week 2	Creating- arcs.
Week 3	Creating- circles.
Week 4	Creating -POLYLINE
Week 5	Creating- ELLIPSE
Week 6	Creating -POLYGON
Week 7	Creating -RECTANGLE

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
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
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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.

First and Second Semester

Module 1

Module Information		
Module Title	Workshops	Module Delivery
Module Type	Support	☐ Theory
Module Code	COE116	☐ Lecture
ECTS Credit/year	4	☐ Lab ☐ Tutorial
SWL/year	100	■ Practical ☐ Seminar
Module level	1	Semester of Delivery	1, 2
Module Leader	Training and Workshops Center	College	
Module Leader Academic Title		e-mail	
Module Tutor		Module Leader's Qualification	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		e-mail	
		Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	1-Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and

	Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. ٦- Cooperative learning by working collectively.
Inductive Contents	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization 6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization 9. Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Learning and Teaching Strategies	
Strategies	

Student Workload (SWL)			
Structured SWL (h/sem)	46.5	Structured SWL (h/w)	3.00
Unstructured SWL (h/sem)	3.5	Unstructured SWL (h/w)	0.23
Total SWL (h/sem)	50		
Structured SWL (h/year)	93	Structured SWL (h/w)	3.00
Unstructured SWL (h/year)	7	Unstructured SWL (h/w)	0.23
Total SWL (h/year)	100		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments				All
	Projects / Practice	Every 3 weeks	60%	Continuous	
	Report				
Summative Assessment	Midterm Exam				
	Exam	Every 3 weeks	40%	Continuous	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Welding workshop. -Occupational safety and its importance in welding workshops. -Introduction to the basics of welding. -Electric arc exercise. -An exercise for welding straight lines in a circular motion (helical).
Week 2	Welding workshop - An exercise for welding straight lines with a crescent movement and other welding methods -Construction welding exercise.
Week 3	Welding workshop. -Welding two pieces together. -Written exam in practical exercises. -
Week 4	Casting workshop -Occupational safety and its importance in plumbing workshops.

	-Introduction to the basics of metal casting. -Simple wooden disc exercise. Half workout.
Week 5	Casting workshop Wheel exercise. Pushing arm exercise.
Week 6	Casting workshop. -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.
Week 7	Blacksmith Workshop -Occupational safety and its importance in blacksmithing workshops. -Introduction to the Basics of Blacksmithing. - Barbell adjustment exercise. -Eight-star exercise. - Exercise forming the number eight in English. -Six formation exercises in English.
Week 8	Blacksmith Workshop -An exercise forming the number five in English. - Exercise forming the number nine in English. -An exercise in forming an iron model in the form of a circle .
Week 9	Blacksmith Workshop - S-shape exercise. - Air hammer hot barbell exercise. - Exercise to form a circle on an electric bending machine. - Exercising cold and hot ornament formation. - A written exam in practical exercises .
Week 10	Automotive Workshop -Occupational safety and its importance in car maintenance workshops. -An introduction to cars and their basic parts. -Parts of the engine, how it works, types of engines, and methods of classification.
Week 11	Automotive Workshop - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	Automotive Workshop -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	Turning Workshop -Introduction to lathe machines and identifying their parts -Measuring tools and the use of an oven measuring instrument

	-Circular column lathing exercise on different diameters.
Week 14	Turning Workshop -Exercise using the pen (semicircular R) brackets. An exercise in making different angles using a pen (square + angle pen 55).
Week 15	Turning Workshop - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). -Written exam in practical exercises.
Week 16	Fitting workshop Occupational safety and its importance in filing workshops -An introduction to the basics of filing -Pen holder exercise "preparation and preparation"
Week 17	Fitting workshop Pencil holder exercises finishing and assembling.
Week 18	Fitting workshop -The catcher exercise. - Clamping exercise. Written exam in practical exercises.
Week 19	Carpentry workshop -Occupational safety and its importance in carpentry workshops. - An introduction to carpentry, its types, types of wood, tools used, and preparation Preparing the tools used Face modification exercise using the reindeer
Week 20	Carpentry workshop Garden fence work and how to connect its parts, the eight-star exercise
Week 21	Carpentry workshop - Wood smoothing exercise using smoothing paper - Wood dyeing exercise in three stages Final smoothing and varnishing exercise Written exam in practical exercises
Week 22	The tinsmith workshop Occupational safety and its importance in plumbing workshops An introduction to plumbing, its tools, and plumbing stages Planning and marking exercise on metal plates
Week 23	The tinsmith workshop Geometric shapes Types of individuals and methods of individuals Geometric shape individuals exercise on a metal board
Week 24	The tinsmith workshop Cone members exercise

	- Exercise of cylinders with an oblique cut Roll forming operations Connection without the use of an intermediary Written exam in practical exercises
Week 25	Electric Workshop Occupational Safety and its importance in electrical workshops An introduction to the basics of electrical installations - Linking a simple circuit consisting of a lamp to the control of a single-way switch. Connect two lamps in series with one-way switch control. Connecting two lamps in parallel with the control of a single road switch. Connect two lights with one-way dual switch control.
Week 26	electric Workshop Connect a fluorescent lamp circuit to a one-way switch control Connecting an electric supply socket circuit to the control of a separate or combined one-way switch Written exam in practical exercises
Week 27	electric Workshop Occupational Safety and its importance in blacksmithing workshops Introduction to the basics of Blacksmithing - Barbell adjustment exercise Eight-star exercise - Exercise forming the number eight in English Exercise forming the number six in English
Week 28	supplementary training curriculum Welding workshop Plumbing workshop Blacksmith's workshop
Week 29	supplementary training curriculum - Automotive workshop - Turning workshop Fitting workshop
Week 30	supplementary training curriculum Carpentry workshop The plumbing workshop electric Workshop

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	yes

Recommended Texts		
Websites		

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Engineering Analysis**	**Module Delivery**
Module Type	**B**	☒Theory
Module Code	ENAN208	☐ Lecture
ECTS Credits	5	☐Lab
SWL (hr/sem)	**75**	☒Tutorial
		☐Practical
		☐Seminar

Module Level	UGII	Semester of Delivery	4
Administering Department	Computer engineering	**College**	College of engineering
Module Leader	Aya abdulrahman kadhim	**e-mail**	Aya.a.kadhim@gu.edu.iq
Module Leader's Acad. Title	Asst.lect.	**Module Leader's Qualification**	M.sc.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

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

Module Objectives أهداف المادة الدراسية	The objective of this course is to develop an understanding of the basic ideas of mathematics encountered in engineering. Focus will be on the methods for understanding complex numbers and fundamentals of the derivative and integration of inverse trigonometric functions. Students will learn some special integration techniques (Integration by part, partial fraction, and substitution) that are useful for the understanding of different engineering subjects. Another objective is to teach the Engineering student about integration applications such as Area under curve and volume. Finally, the student will learn the concept of polar coordinates and its application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 1. Understand the fundamentals of complex numbers and their properties. 2. Understand the differentiation and integration of inverse trigonometricfunctions. 3. Understand the differentiation and integration of hyperbolic trigonometricfunctions. 4. Express the concepts of methods of integration and their different types which can be used in a wide variety of disciplines in engineering. 5. Identify integration applications such as Area under curve and area betweentwo curves. 6. Apply different integration rules to determine the volume of solid using Diskand Washer methods. 7. Understand polar coordinates and their properties. 8. Apply the concept of polar coordinates to solve integration applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Fundamental Concepts of complex numbers. • Complex numbers properties- power and roots • Inverse Trigonometric function and their differentiation • Inverse Trigonometric function Integration • Hyperbolic Trigonometric functions and their differentiation • Hyperbolic Trigonometric functions integration • Methods of integration – Integration by Part

	- Methods of integration - Partial fraction method - Methods of integration – Integration using substation - Integration applications – Area under curve - Integration applications – Area between two curves - Integration applications – Volume of solid using Disk method - Integration applications – Volume of solid using Washer methods - Polar coordinates and its properties - Area under curve in Polar coordinates - Area between two curves in Polar coordinates - Length of curve in Polar coordinates.

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 types of simple reports involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	5 and 10	LO #2, #3 and #5, #6
	Assignments	2	15% (15)	2 and 12	LO #1 and #5
	Report	1	10% (10)	13	LO # 3, #4, #5, and #6
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	Ordinary differential equation – first order- variable separable
Week 2	Ordinary differential equation – first order- homogenous
Week 3	Ordinary differential equation – first order- Exact
Week 4	Ordinary differential equation – first order - Linear
Week 5	Ordinary differential equation – second order – undetermined coefficient
Week 6	Ordinary differential equation – second order – variation of parameter
Week 7	Ordinary differential equation – higher order
Week 8	**Mid-term Exam**
Week 9	Laplace transform - properties

Week 10	Inverse Laplace transform
Week 11	Solving Ordinary differential equation using Laplace transform
Week 12	Z - transform
Week 13	Z - transform properties
Week 14	Inverse Z - transform
Week 15	**Preparatory week before the final Exam**

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus, Single Variable, Joel Hass, ChristopherHeil, Maurice Weir, Pearson, 2017.	Yes
Recommended Texts	Thomas' Calculus Early Transcendentals, George Thomas, Maurice D. Weir, Joel Hass, Pearson, 2014.	yes
Websites	https://www.coursera.org/learn/ calculus I	

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

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td>Electronic II</td>
<td colspan="2">Module Delivery</td>
</tr>
<tr>
<td>Module Type</td>
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<td colspan="2" rowspan="4">☒Theory
☒Lecture
☒Lab
☒ Tutorial
☐ Practical
☐ Seminar</td>
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<tr>
<td>Module Code</td>
<td>ECE204b</td>
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<td>ECTS Credits</td>
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<tr>
<td>SWL (hr/sem)</td>
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<tr>
<td>Module Level</td>
<td>UG</td>
<td>Semester of Delivery</td>
<td>2</td>
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<tr>
<td>Administering Department</td>
<td>Type Dept. Code</td>
<td>College</td>
<td>Type College Code</td>
</tr>
<tr>
<td>Module Leader</td>
<td>Buraq karim</td>
<td>e-mail</td>
<td>buraq.k.shebli@gu.edu.iq</td>
</tr>
<tr>
<td>Module Leader's Acad. Title</td>
<td>Lecture</td>
<td>Module Leader's Qualification</td>
<td>master</td>
</tr>
<tr>
<td>Module Tutor</td>
<td>Buraq karim</td>
<td>e-mail</td>
<td>buraq.k.shebli@gu.edu.iq</td>
</tr>
<tr>
<td>Peer Reviewer Name</td>
<td>Name</td>
<td>e-mail</td>
<td>E-mail</td>
</tr>
<tr>
<td>Scientific Committee Approval Date</td>
<td>9/2024</td>
<td>Version Number</td>
<td>1.0</td>
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<table>
<tr><td colspan="4" align="center">Relation with other Modules

العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr>
<td>Prerequisite module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
</table>

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

Module Objectives أهداف المادة الدراسية	The course improves the student's ability to understand transistor amplifier and amplifier frequency response in various applications. In addition, in this course the student studies the effects of internal and external capacitance on operating frequency, power amplifier and the methods used in different amplifiers all the way to carrying out a small project related to this topic.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. On successful completion of this unit, the student should be able to 1. Understand the application of bipolar transistors in linear amplifier circuit, where the transistor circuit can amplify a small time-varying signal for the output stage. 2. Discuss the three basic transistor amplifier configurations (CE, CB, and CC) and compare between these configurations. 3. Explain the frequency response of transistor circuits. 4. Draw Bode plots to select 3 dB frequencies directly. 5. Represent the small signal equivalent circuit for both bipolar and MOS, 6. Explain the effect of coupling and bypass capacitors on the low and high-frequency characteristics of a circuit. 7. Design the 2-stage BJT amplifier to meet specific frequencies of 3dB. 8. Describe the concept of a power amplifier with study the characteristics of the BJT and MOSFET power transistors. 9. Define various classes of power amplifiers and determine the maximum power efficiency of each class of amplifier. 10. Discuss the ideal class-B output stage. 11. Develop various circuit configurations of class-AB output stages and the output stage using MOSFETs as output devices.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Basic BJT amplifiers**: Analog signals and liner amplifiers, BJT amplifier configuration , AC load line analysis, multistage amplifiers, power consideration, design application Audio amplifier.

| | Frequency Response: Amplifier Frequency response, system transfer function, Transistor amplifiers with circuit capacitors, Frequency response for BJT and FET, High frequency response of transistor circuits, Design application a two-stage amplifier with coupling capacitors.

Power Amplifiers: In this chapter, power amplifiers are defined, analyzed, and designed for circuits that provide a given power supply to a load. Power dispersion in transistors is also studied especially in the output stage where linearity is an important parameter in the output signal. |
|---|---|

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Explain to the student that most electronic applications are built around subject, especially with a mini project or last year's project. Emphasize that this course presents a mini-project, or that any new or developed projects are required to understand the transistor amplifier, frequency response of an amplifier, the concept of multistage of amplifiers, power amplifier and it is application in the output stage of the most electronic circuits.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	96	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	110	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	206		

<table>
<tr><td colspan="5" align="center">**Module Evaluation**

تقييم المادة الدراسية</td></tr>
<tr><td></td><td></td><td>**Time/Number**</td><td>**Weight (Marks)**</td><td>**Week Due**</td><td>**Relevant Learning Outcome**</td></tr>
<tr><td rowspan="4">**Formative assessment**</td><td>**Quizzes**</td><td>2</td><td>10% (10)</td><td>5 and 10</td><td>LO #1, #2 and #10, #11</td></tr>
<tr><td>**Assignments/ homework**</td><td>2</td><td>10% (10)</td><td>4 and 9</td><td>LO #3, #4 and #6, #7</td></tr>
<tr><td>**Lab.**</td><td>2</td><td>10% (10)</td><td>Continuous</td><td>All</td></tr>
<tr><td>**Mini project/Report/seminar**</td><td>1</td><td>10% (10)</td><td>15</td><td>ALL</td></tr>
<tr><td rowspan="2">**Summative assessment**</td><td>**Midterm Exam**</td><td>2hr</td><td>10% (10)</td><td>16</td><td>All</td></tr>
<tr><td>**Final Exam**</td><td>3hr</td><td>50% (50)</td><td></td><td>All</td></tr>
<tr><td colspan="2" align="right">**Total assessment**</td><td colspan="2">100% (100 Marks)</td><td></td><td></td></tr>
</table>

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
		Material Covered
Week 1		**Basic BJT amplifiers**: Analog signals and liner amplifiers
Week 2		AC load line analysis
Week 3		BJT amplifier configuration (CE, CB, and CC)
Week 4		Multistage amplifiers and **homework**.
Week 5		Multistage amplifiers, power consideration and **Quizzes**
Week 6		**Frequency response:**

	Introduction to discuss the general frequency response characteristics of amplifiers.
Week 7	Derive the system transfer functions of two simple R–C circuits, develop the Bode plots for the magnitude and phase of the transfer functions, and become familiar with sketching the Bode diagrams.
Week 8	Analyze the frequency response of transistor circuits with capacitors.
Week 9	Determine the frequency response of the bipolar transistor, and determine the Miller effect, Miller capacitance and **homework**.
Week 10	Determine the frequency response of the MOS transistor and determine the Miller effect and Miller capacitance and **Quizzes.**
Week 11	Determine the high-frequency response of basic transistor circuit configurations including the cascode circuit.
Week 12	**Power Amplifier**: Power Transistors and Classes of Power Amplifiers
Week 13	Class-A Power Amplifiers
Week 14	Class-AB Push-Pull Complementary output stages
Week 15	Presentation of Mini project-design application such as (Audio Amplifier, A two stage amplifier with coupling capacitors and an output stage using MOSFETs).
Week 16	**Midterm Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	Multi-transistor configuration , common emitter.
Lab 2	Common collector amplifiers
Lab 3 &4	Frequency Response of Common Emitter Amplifier, Buffer
Lab 5	Design MOSFET amplifier for use in a telephone circuit
Lab 6	Power Amplifier

<table>
<tr><th colspan="3">Learning and Teaching Resources

مصادر التعلم والتدريس</th></tr>
<tr><td></td><td>Text</td><td>Available in the Library?</td></tr>
<tr><td>Required Texts</td><td>Microelectronic circuit analysis and design, by Donald A.Neamen.</td><td>Yes</td></tr>
<tr><td>Recommended Texts</td><td>1. Electronic Devices and Circuit Theory Eleventh Edition
Robert L. Boylestad Louis Nashelsky
2. Microelectronics Circuits, Oxford University Press, Sedra and Smith, 1998,</td><td>No</td></tr>
<tr><td>Websites</td><td colspan="2">https://ocw.mit.edu/courses/6-012-microelectronic-devices-and-circuits-fall-2009/pages/calendar/</td></tr>
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<table>
<tr><th colspan="5">Grading Scheme

مخطط الدرجات</th></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks %</td><td>Definition</td></tr>
<tr><td rowspan="5">Success Group
(50 - 100)</td><td>A - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>B - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>C - Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>D - Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>E - Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">Fail Group
(0 – 49)</td><td>FX – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>F – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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.

Electronics I

Module Information

معلومات المادة الدراسية

Module Title		Electronics I	**Module Delivery**
Module Type		C	☐ Theory
Module Code		COE206	☒ Lecture
ECTS Credits		6	☐ Lab
SWL (hr/sem)		150	☒ Tutorial
			☐ Practical
			☐ Seminar

Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	University of Gilgamesh	**College**	Engineering
Module Leader	Buraq karim	**e-mail**	Buraq.k.shebli.gu.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Buraq karim	**e-mail**	Buraq.k.shebli.gu.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	1.0

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

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	After completing this module, students should have developed a clear understanding of the fundamental concepts of single variable math problems and a range of skills allowing them to work effectively with the concepts. The basic concepts are: 1. Derivatives as rates of change, are computed as a limit of ratios. 2. Integrals as a "sum," computed as a limit of Riemann sums.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, students should demonstrate competency in the following skills: 1. Use both the limit definition and rules of differentiation to differentiate functions. 2. Sketch the graph of a function using asymptotes, critical points, the derivative test for increasing/decreasing functions, and concavity. 3. Apply differentiation to solve applied max/min problems. 4. Apply differentiation to solve related rate problems. 5. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. 6. Apply integration to compute arc lengths, volumes of revolution, and surface areas of revolution.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: This Math module covers the differentiation and integration of functions of one variable and concludes with a brief discussion of infinite series. Calculus is fundamental to many scientific disciplines including physics, engineering, and economics. The basic concepts are: Derivatives as rates of change, computed as a limit of ratios, Integrals as a "sum," computed as a limit of Riemann sums, use both the limit definition and rules of differentiation to differentiate functions. Sketch the graph of a function using asymptotes, critical points, the derivative test for increasing/decreasing functions, and concavity. Apply differentiation to solve applied max/min problems. Apply differentiation to solve related rate problems. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Apply integration to compute arc lengths, volumes of revolution, and surface areas of revolution.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This module will be delivered through lectures and enhanced with tutorials where students will be divided into small groups. Active learning will be implemented via collaborative groups.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			**150**

Module Evaluation

تقييم المادة الدراسية

	As	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	5 and 10	LO #1, #2 and #5, #6
	Problem sets	5	20% (20)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #4
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	The Bohr atom, Electron orbits and energy, Valence electrons , energy bands (valence &conduction bands)
Week 2	Conductor , semiconductors and insulators , Fermi level , intrinsic & extrinsic semiconductors (N& P types), Effect of temperature on extrinsic semiconductors, Electron – hole pairs
Week 3	Depletion region, Acceptors & donors, Revers & forward biasing condition, I- V characteristics of a P- N junction
Week 4	P-N junction Capacitance, P-N diode, Effect of temperature on diode characteristics, Zener region, Power dissipation in P-N diodes
Week 5	Parallel & series- parallel configurations ,P-N diode circuit analysis
Week 6	Load –line method and approximate method, Half-wave rectification
Week 7	Full- wave rectification, Clippers
Week 8	Clampers, Zener diode application
Week 9	exam
Week 10	Structure & operation, Common –base configuration analysis & characteristic
Week 11	Common-emitter configurations analysis & characteristics, Common-collector configuration analysis & saturation, Transistor maximum ratings, Temperature effects, fixed bias circuit (forward bias of base-emitter, reverse bias of base-collector)
Week 12	DC bias circuit with emitter resistor, DCbias circuit independent of Beta, DC bias with voltage feedback , Analysis of various DC bias circuits, Bias stabilization, Application
Week 13	General description of FET construction and characteristics of JFET and fixed biasing transfer characteristic, MOSFET construction and characteristics (Depletion , Enhancement , VMOS , CMOS

Week 14	Fixed – bias , self – bias , voltage divider biasing , depletion type MSOSFET enhancement – type MOSFETs , Design, P- Channel FETs , Universal JFET bias curve .Application of FET CMOS
Week 15	exam
Week 16	The Bohr atom, Electron orbits and energy, Valence electrons , energy bands (valence &conduction bands)

	Learning and Teaching Resources مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Textbook: R. Boylston & L.Nashelsy, " Electronic Devices & Circuit Theory " , 4thed 1991. Charle E . Merrill Publishing Company.	No
Recommended Texts	2. R.J. Tocci , " Electronic Devices " , 3rd ed . 1983,	Yes
Websites	https://www.coursera.org/search?query=mathematics&=null&index=prod_all_launched_products_term_optimization	

		Grading Scheme مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	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.

Operating system

Module Information معلومات المادة الدراسية				
Module Title		Operating system	**Module Delivery**	
Module Type		Core	☒ Theory	
Module Code		OPSY214	☒ Lecture	
ECTS Credits		6	☐ Lab	
SWL (hr/sem)		150	☐ Tutorial	
			☐ Practical	
			☐ Seminar	
Module Level	2	**Semester of Delivery**		4
Administering Department	ECE	**College**	College of engineering	
Module Leader	Lina Thamer Sultan	**e-mail**	E-mail: Lina.t.sultan@gu.edu.iq	
Module Leader's Acad. Title	Assist.lecturer	**Module Leader's Qualification**	master	
Module Tutor		**e-mail**		
		e-mail		
Scientific Committee Approval Date		**Version Number**	1.0	

<table>
<tr><td colspan="4" align="center">**Relation with other Modules**
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>**Prerequisite module**</td><td>None</td><td>**Semester**</td><td></td></tr>
<tr><td>**Co-requisites module**</td><td>None</td><td>**Semester**</td><td></td></tr>
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<table>
<tr><td colspan="2" align="center">**Module Aims, Learning Outcomes and Indicative Contents** أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr><td>**Module Objectives**
أهداف المادة الدراسية</td><td>1. Provide an understanding of the fundamental concepts, principles, and functions of operating systems.

2. To explore the various components and mechanisms involved in managing computer hardware and software resources.

3. To develop knowledge and skills related to process management, memory management, file systems, and other key aspects of operating systems.</td></tr>
</table>

<table>
<tr><td></td><td>4. To foster critical thinking and problem-solving abilities in the context of operating system design and implementation.

5. To prepare students for advanced studies or professional careers in operating systems, systems programming, or related fields.

6. To explore advanced topics such as distributed systems, real-time systems, and virtualization.

7. To develop skills in analyzing and designing complex operating system architectures.

8. To explore emerging trends and technologies in the field of operating systems.

9. To prepare students for advanced research or professional careers in operating systems or related areas.</td></tr>
</table>

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: Explain the basic concepts, types, and functions of operating systems. Understand process management, including process creation, scheduling, and synchronization. Analyze and apply memory management techniques, including virtual memory and page replacement algorithms. Describe file system concepts, file organization, and access methods. Understand input/output (I/O) management, including device drivers and I/O operations. 1. 2. 3. Discuss protection and security mechanisms in operating systems. Understand the principles of multi-programming, multi-tasking, and CPU scheduling. 4. 5. Explain the basics of distributed operating systems and networking. 6. 7. Analyze and troubleshoot common issues related to operating systems. 8. Understand and design distributed systems and inter-process communication mechanisms. 9. Analyze and design real-time operating systems for time-critical applications. 10. 11. 12. 13. Understand and apply virtualization technologies and techniques. 14. Explore emerging trends and technologies in the field of operating systems. Conduct research, analyze and critically evaluate operating system research papers.
Indicative Contents المحتويات الإرشادية	The following are indicative topics that may be covered in an operating systems course: 1. Introduction to Operating Systems: • Definition, types, and functions of operating systems. • Historical overview and evolution of operating systems. • Operating system structures and components. 2. Process Management: • Process concepts, process states, and process control block (PCB). • Process creation, scheduling, and context switching. • Interprocess communication and synchronization.

3. Memory Management:
- Memory hierarchy and memory management techniques.
- Address spaces, logical vs. physical memory, and memory allocation.
- Paging, segmentation, and virtual memory.

4. File Systems:
- File concepts, file organization, and access methods.
- Directory structures and file allocation methods.
- File system implementation, disk management, and file I/O operations.

5. Input/Output Systems:
- I/O devices, device controllers, and device drivers.
- I/O operations, buffering, and spooling.
- Interrupt handling and I/O scheduling algorithms.

6. CPU Scheduling:
- CPU scheduling algorithms and their evaluation.
- Process coordination, synchronization, and deadlock prevention.
- Multiprogramming and multitasking concepts.

7. Distributed Operating Systems:
- Introduction to distributed systems and networking.
- Distributed system architectures and models.
- Distributed file systems, distributed process management, and synchronization.
- Communication protocols and distributed resource allocation.
- Fault tolerance and replication in distributed systems.

8. Real-Time Operating Systems:
- Characteristics and requirements of real-time systems.
- Real-time scheduling algorithms and analysis.
- Resource management and synchronization in real-time systems.
- Real-time operating system design considerations.

9. Virtualization:
- Virtualization concepts and techniques.
- Virtual machine management and resource allocation.

	• Virtualization security and performance considerations.
	10. Advanced Memory Management:
	• Advanced memory management techniques, such as segmentation and paging.
	• Memory protection and access control mechanisms.
	• Memory virtualization and memory ballooning.
	• Memory management in virtualized environments.
	11. Advanced Process and Thread Management:
	• Multi-core and multi-threaded systems.

	• Thread scheduling algorithms and techniques.
	• Process migration and load balancing.
	• Thread synchronization and concurrency control mechanisms.
	12. Security in Operating Systems:
	• Security threats and vulnerabilities in operating systems.
	• Access control mechanisms, including mandatory and discretionary access control.
	• Intrusion detection and prevention systems.
	• Security in virtualized environments.
	13. Emerging Trends in Operating Systems:
	• Cloud computing and operating systems.
	• Edge computing and Internet of Things (IoT) operating systems.
	• Containerization and container orchestration systems.
	• Operating systems for specialized architectures (e.g., GPUs, mobile devices).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	1. Interactive Demonstrations: Conduct interactive demonstrations of operating system functionalities and features. Use visual aids, interactive tools, or live demonstrations to engage students and enhance their understanding of complex concepts. 2. Online Resources and Tutorials: Recommend online resources, tutorials, and interactive platforms that offer supplementary materials and exercises for self-paced learning. This allows students to explore topics at their own pace and reinforce their understanding of operating systems. 3. Formative Assessments and Feedback: Provide regular formative assessments, such as quizzes or short assignments, to gauge students' understanding of operating system concepts. Provide prompt feedback to address misconceptions and guide students towards a deeper understanding of the subject. 4. Group Projects and Collaborative Learning: Assign group projects that require students to work collaboratively to solve operating system-related problems. This encourages teamwork, communication, and the exchange of ideas, and allows students to learn from each other's experiences. 5. Discussions and Debates: Engage students in discussions and debates on operating system-related topics. Encourage critical thinking, analysis of different viewpoints, and the exploration of alternative approaches to operating system design and implementation. 6. Case Studies and Real-World Examples: Use case studies and real-world examples to illustrate the application of operating system concepts. This helps students
	understand how operating systems are used in practical scenarios and reinforces their understanding of the subject matter. 7. Stay Updated with Technology Advances: Stay informed about the latest advancements in operating systems and related technologies. Incorporate current trends and emerging technologies into the curriculum to ensure students are exposed to relevant and up-to-date knowledge.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	30% (30)	7 and 14	LO #1 and 6
Assignments	2	10% (10)	9 and 15	LO # 1 and 7
Projects / Lab.	1	10% (10)	Continuous	All
Report	1	10% (10)	13	LO #2 - #5
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 Operating Systems, Computer-System Organization, Computer-System Architecture, Operating-System types, functions Structure and components
Week 2	Operating-System Operations, Process Management, Memory Management, Storage Management
Week 3	Operating System Structure, Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs

Week 4	Operating System Design and Implementation, Operating System Structure, Operating System Debugging, Operating System Generation, System Boot
Week 5	Process, Process Concept, Process Scheduling , Operations on Processes, Inter-process Communication
Week 6	File concepts, organization, access methods, Directory structures ,file allocation methods ,File system implementation, disk management and file I/O operations.
Week 7	I/O devices, device controllers, , device drivers.I/O operations, buffering, spooling, Interrupt handling and I/O scheduling algorithms
Week 8	Midterm Exam
Week 9	Introduction to distributed systems ,Distributed file systems, distributed process management, and synchronization , distributed resource allocation,Fault tolerance and replication
Week 10	Real-time systems Characteristics and requirements, scheduling algorithms and analysis, Resource management and synchronization and system design considerations.
Week 11	Virtualization concepts and techniques , Virtual machine management and resource allocation ,Virtualization security and performance considerations
Week 12	Advanced memory management techniques , Memory protection Memory virtualization
Week 13	Advanced Process and Thread Management: Process migration and load balancing. Thread scheduling, synchronization and control
Week 14	Security in Operating Systems
Week 15	Emerging Trends in Operating Systems:

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	**Available in the Library?**

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Required Texts	● William stallings "operating systems - internals and design principles" 7th edition,2011 ● "Modern Operating Systems" by Andrew S. Tanenbaum and Herbert Bos		Yes
Recommended Texts	● "Distributed Systems: Principles and Paradigms" by Andrew S. Tanenbaum and Maarten Van Steen ● "Real-Time Systems" by Jane W. S. Liu		Yes
Websites	https://learn.saylor.org/course/view.php?id=94 https://www.classcentral.com/subject/operating-systems		

				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.

Object Oriented Programming

Module		
Module **Information**معلومات المادة الدراسية		
Module Title	**Object Oriented Programming**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code		
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	2	Semester of Delivery	1
Administering Department	ECE	College	Engineering
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Lina Thamer Sultan	e-mail	
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand Core OOP Concepts ○ Grasp essential OOP concepts such as classes, objects, inheritance, polymorphism, encapsulation, and abstraction. ○ Learn how these concepts are used to model real-world entities and systems. 2. Apply OOP to Problem Solving ○ Analyze real-world problems and break them down into manageable components using OOP methodologies. ○ Develop logical, structured solutions by applying OOP principles to effectively model data and processes. 3. Write Modular and Reusable Code ○ Design code that is modular, scalable, and reusable by adhering to the principles of object-oriented design. ○ Learn to develop clean, maintainable software that reduces redundancy and enhances collaboration. 4. Implement OOP in Modern Programming Languages ○ Gain hands-on experience programming in languages that support OOP, such as C++ or Java. ○ Develop proficiency in writing, compiling, and debugging OOP code. 5. Leverage Design Patterns in OOP ○ Introduce students to common design patterns such as Singleton, Factory, Observer, and others to solve recurring software design problems. ○ Understand when and how to apply these patterns to improve software architecture and efficiency. 6. Collaborate on Software Development Projects ○ Encourage teamwork through group projects, fostering collaboration in designing and developing software applications. ○ Simulate a real-world software development environment where students engage in version control, testing, and iterative development cycles. 7. Develop Critical Thinking and Debugging Skills ○ Instill problem-solving skills for debugging and optimizing OOP code. ○ Encourage students to develop a habit of writing well-documented code that is easy to test and maintain. The course will prepare students for careers in software development by providing the tools and techniques necessary to build complex, efficient, and reliable applications using object-oriented programming.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate Understanding of OOP Principles 2. Develop Object-Oriented Programs 3. Use Inheritance and Polymorphism in Software Design 4. Apply Encapsulation and Abstraction 5. Implement and Recognize Design Patterns 6. Debug and Test OOP Code 7. Work Collaboratively on Software Projects 8. Critically Evaluate and Optimize OOP Solutions

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – OOP Theory 1. Introduction to Object-Oriented Programming ○ Overview of programming paradigms, focusing on the evolution from procedural programming to OOP. ○ Introduction to core concepts: objects, classes, methods, attributes, and constructors. ○ Benefits of OOP in software development: modularity, reuse, and extensibility. ○ [8 hrs] 2. Core OOP Concepts ○ Encapsulation: Principles of data hiding, access modifiers (private, public, protected). ○ Abstraction: Creating simplified representations of real-world entities through abstract classes and interfaces. ○ Inheritance: Types of inheritance, base and derived classes, and reuse of code. ○ Polymorphism: Method overloading and method overriding, dynamic vs static polymorphism. ○ [10 hrs] 3. Classes, Objects, and Memory Management ○ How to define classes and create objects, constructors, destructors, and the lifecycle of an object. ○ Memory allocation, deallocation, and garbage collection in OOP. ○ [6 hrs] 4. Exception Handling ○ Introduction to exceptions, try-catch blocks, and throwing exceptions. ○ Understanding exception hierarchies and custom exceptions. ○ Writing robust OOP programs with effective error-handling techniques. ○ [4 hrs] Part B – OOP Design and Programming

1. Object-Oriented Design (OOD)
   - Principles of software design using OOP: SOLID principles, cohesion, and coupling.
   - Understanding UML diagrams: class diagrams, sequence diagrams, and use case diagrams to model software.
   - Design patterns: Factory, Singleton, Observer, Decorator, and their implementation in OOP.
   - [12 hrs]

2. Programming with OOP Languages
   - Practical programming with languages like C++, Java, or Python.
   - Writing programs using classes, objects, inheritance, and polymorphism.
   - Managing file I/O, working with collections, and manipulating objects.
   - [18 hrs]

3. Advanced OOP Features
   - Concepts of abstract classes and interfaces and their differences.
   - Understanding and implementing generic programming (templates in C++, generics in Java).
   - Multithreading and synchronization in OOP, introducing concurrency in object-oriented design.
   - [14 hrs]

4. Testing and Debugging OOP Code
   - Unit testing with frameworks (e.g., JUnit for Java), writing test cases, and running automated tests.
   - Debugging OOP programs, tracking down logical and runtime errors.
   - Best practices for debugging and optimizing OOP code.
   - [6 hrs]

5. Collaborative Software Development and Version Control
   - Working in teams on software projects: implementing OOP design in collaborative environments.
   - Using version control systems (e.g., Git) to manage code, handle merges, and collaborate effectively on large-scale OOP projects.
   - Introduction to Agile and Scrum methodologies.
   - [6 hrs]

Part C – OOP Project Work

1. Capstone Project
   - Students will design, implement, and present a full object-oriented software solution as a final project.
   - The project will require the application of all learned OOP concepts, from design through implementation, testing, and documentation.
   - Emphasis on applying design patterns, inheritance, polymorphism, and other key OOP principles.

		○ [24 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	To teach Object-Oriented Programming (OOP), a combination of lectures and hands-on coding exercises will be used to introduce and reinforce core concepts like classes, inheritance, and polymorphism. Problem-based learning (PBL) will engage students in solving real-world challenges using OOP principles. Interactive coding demonstrations will illustrate practical applications, while project-based learning will encourage students to build full software solutions. Additionally, peer code reviews will foster collaboration and critical thinking, allowing students to refine their coding skills through feedback and discussion..

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	98	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluationتقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 13	LO #1 - #4 and #6 - #8
	Assignments	2	10% (10)	6 and 11	LO #5, #4 and #8, #10
	Lab.	14	10% (10)	Continuous	All
	Mini project	1	10% (10)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	9	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Programming in C and C++-control structures, functions, pointers, arrays and structures.
Week 3	Introduction to Software Engineering-life cycle: analysis, design, implementation and maintenance
Week 4	Object-Oriented programming model-encapsulation, information hiding, polymorphism, inheritance.
Week 5	C++/0bject-Oriented concepts-classes, information hiding, encapsulation
Week 6	Simple linked data structures-linked lists, stacks, queues
Week 7	C++/Object-Oriented concepts-operator overloading
Week 8	C++/0bject-Oriented concepts-inheritance, and polymorphism.
Week 9	**Mid-term Exam**
Week 10	C++ templates, streams and stream I/O.
Week 11	C++ file processing, string class, string stream processing.
Week 12	C++ legacy code topics, standard template library.
Week 13	Fundamental computing algorithms C simple searching and sorting (linear and binary search, selection and insertion sort).
Week 14	Practices and exercises
Week 15	Projects, exams and review.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Set up development tools and write a basic "Hello, World!" program.
Week 2	Define classes and create objects with constructors and destructors.
Week 3	Implement methods and use access modifiers to control data access.
Week 4	Apply encapsulation and abstraction with abstract classes and interfaces.
Week 5	Implement inheritance to create base and derived classes.
Week 6	Use polymorphism through method overloading and overriding.
Week 7	Manage object memory and practice dynamic allocation.
Week 8	Learn exception handling with try-catch blocks and custom exceptions.

Week 9	Start a midterm project involving a simple OOP application.
Week 10	Work on advanced OOP features like abstract classes and interfaces.
Week 11	Implement and apply design patterns to solve common programming problems.
Week 12	Develop and debug complex OOP programs; focus on unit testing.
Week 13	Collaborate on a group project, applying OOP concepts in a team setting.
Week 14	Finalize and present group projects, demonstrating OOP knowledge.
Week 15	Review and reflect on key concepts, and discuss lessons learned from projects.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, C++ Primer, Addison-Wesley Professional; Sth cdition, ISBN- 10: 0321714113, or ISBN-13:978-0321714114	Yes
Recommended Texts	Bjame Stroustrup, The Ct+ Programming Language, Addison-Wesley Professional, 4th Edition, ISBN-10: 0321563840 ISBN-13:978-0321 563842 (advanced)	Yes
Recommended Texts	Robert Lafore, Object-Oriented Programming in C++, Sams Publishing, 4th Edition,	

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.

Data structures and algorithms

هياكل بيانات وخوارزميات

Module Information			
معلومات المادة الدراسية			
Module Title	a structures and algorithms	**Module Delivery**	
Module Type		☒ Theory	
Module Code	COE22306	☐ Lecture	
ECTS Credits		☒ Lab	
SWL (hr/sem)		☐ Tutorial ☐ Practical ☐ Seminar	
Module Level	UGx11 2	**Semester of Delivery**	3
Administering Department	ECE	**College**	Engineering
Module Leader	Haneen Jumhoor sabbar	**e-mail**	haneen.g.sabbar@gu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	haneen.g.sabbar@gu.edu.iq
Peer Reviewer Name	Name	**e-mail**	haneen.g.sabbar@gu.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	8. An overview of programming concepts and discrete mathematics. 9. Teaching the student how to represent data in computer memory. 10. Teaching the student linear and non-linear data structures and their types and programming addition, deletion, and search algorithms. 11. Efficiently perform operations on lists, stack and queues. 12. Understand the non-linear data structures represented by trees, their synthesis and programming. 13. Ability to distribute data by Hashing table and Priority Queues (Heaps). 14. Teaching the student the various methods and techniques of searching and arranging data in each of the data structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. Understand the principle of recursion function in solving problems. 12. Enable the student to acquire overwrite skills. 13. Problem analysis and solution using data structures and Understand the role data structures play in storing information. 14. How to efficiently perform operations on Linked Lists, Linked Stacks, and Linked Queues. 15. Enabling the student to understand three types of tree traversal techniques. 16. How to estimate the time required for a program. 17. How to reduce the running time of a program from days or years to fractions of a second. 18. How to choose one operation to be more efficient if another less efficient. 19. Analyze a problem and determine what problem elements to represent by data structures and algorithms. 20. Apply data structures and algorithms fundamental techniques to develop small scale applications. 21. Trace, analyze, validate and deduce the output of given program code of different complexities
Indicative Contents المحتويات الإرشادية	15. Giving theoretical lectures. 16. Attendance education in laboratory lessons and implementation of the prescribed programs.

	17. Using illustrations through the lectures.
	18. Direct discussion by asking questions and opening the door for dialogue and interaction with students.
	19. Participation during the electronic lecture and answer the questions.
	20. Application of software on the computer for the practical laboratory.
	21. Analysis of a computer program to solve real-world problems based on data structures and algorithms principles.
	higher level of 22. Develop and enhance the student's thinking skill and move him to a thinking.
	23. Creating confidence in the student to design and implement data structures and algorithms to solve practical applied problems.
	24. Raise the spirit of cooperation and work within a team.
	25. Bring out creative ideas among students by raising the spirit of competition.
	26. Group thinking skill strategy.
	27. Critical thinking strategy in learning.
	28. Brainstorming.
	29. Application software.
	30. Student feedback.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	6. Work effectively as an individual and as a member of a team
	7. Demonstrate efficient IT capabilities
	8. Developing capabilities and skills to gain the required level of experience and knowledge for the purposes of employment and personal development.
	9. Enable the student to link the course outcomes with practical life.
	10. Organized and effective planning for program design.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50**1**		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	105 and	# 3, #2LO #75#
	Assignments	2	10% (10)	12 and 2	#76, #4, #3LO #
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	11, #5LO #
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #2 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

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	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction to Data structures and Algorithms, Abstract Data Type, Linear and non-Linear data structures
Week 2	A General Overview on recursion function and algorithm analysis
Week 3	Linked Lists, three type of Insertion and Deletion on Linked Lists, Double Linked List
Week 4	The Stack, The functions associated with stack, Linked Stack, Applications of Stack: Expressions Calculator (Infix, Prefix, and Postfix notation)
Week 5	The Queue and Linked Queue
Week 6	The Tree, Binary Tree
Week 7	Tree Traversals: Inorder, Preorder, and Postorder Traversal
Week 8	Mid-course Exam
Week 9	The Search Tree ADT–Binary Search Trees, AVL Trees, Splay Trees, B-Trees, Sets and Maps in the Standard Library
Week 10	Hashing: General Idea, Hash Function, Separate Chaining
Week 11	Priority Queues (Heaps), Model, Simple Implementations, Binary Heap
Week 12	Priority Queues (Heaps), Model, Simple Implementations, Binary Heap
Week 13	Sorting: Preliminaries, Insertion Sort, Shellsort, Heapsort, Mergesort
Week 14	Sorting: Preliminaries, Insertion Sort, Shellsort, Heapsort, Mergesort
Week 15	Algorithm Design Techniques: Greedy Algorithms, Divide and Conquer, Dynamic Programming, Randomized Algorithms, Backtracking Algorithms
6Week 1	Preparatory week before the final Exam

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي العملي
	Material Covered
Week 1	Lab 1: A General Overview
Week 2	Lab 2: Linked Lists
Week 3	Lab 3: Stacks, Linked Stack
Week 4	Lab 4: Queue, Linked Queue
Week 5	Lab 5: Sets and Maps
Week 6	Lab 6: Hashing, Priority Queues (Heaps)
Week 7	Lab 7: Sorting

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	Available in the Library?
Required Texts	Data Structures and Algorithm Analysis in C++ (Fourth Edition), by M. A. Weiss. Addison-Wesley, ISBN-10: 032144146X & ISBN-13: 9780321441461	No
Recommended Texts	C++ How to Program (5th Edition), by (Harvey & Paul) Deitel & Associates. Prentice Hall, ISBN-10: 0131857576 & ISBN-13: 9780131857575	No
Websites	https://www.w3schools.in/data-structures-tutorial/intro/ https://www.geeksforgeeks.org/data-structures/	

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	probability, random process, and statics	Module Delivery
Module Type	**B**	☒ **Theory**
Module Code	**ECE22306**	☒ **Lecture**
ECTS Credits	**2.0**	☐ **Lab**
SWL (hr/sem)	**50**	☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Level	UGx11 UGII	**Semester of Delivery**	4

Administering Department	ectronics and Communicati Engineering	College	The College of Engineering
Module Leader	Ola Abdulhussein Ahmed	e-mail	ola.a.ahmed@gu.edu.iq
Module Leader's Acad. Title	Assist Lecturer	Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	N.A.	e-mail	N.A.
ientific Committee Approval [	7/2/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	this course helps the student to understand the following: • Knowing the main statistical concept • understand the basics of probability calculations • Knowing the value and importance of the course and explain the possibility of applying it in their specialty.
Module Learning Outcome مخرجات التعلم للمادة الدراسية	At the end of this course the student should be able to: • Knowing how the statistical concept calculates and apply. • robability models for some random experiments (applying them in practical life). • Knowing the value and importance of the course

	and explain the possibility of applying it in their specialty.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – definition the statistic concept and explain the role of probability Define the statistic and explain types of variable, how to summarize and analyze . Calculate the cumulative frequency distribution and practice to draw the frequency dist . Calculate the measures of central tendency and calculate the measures of variation Part B – probability wing the basic interpretations of probability classical probability empirical or relative fre bility subjective probability how to measure them. Understand the concept of sample ace, event, complement of event using addition role of probability. find the value of probability.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Using modern study methods • Adopting the method of discussion and dialogue • .

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
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	**50**		

Module Evaluation				
تقييم المادة الدراسية				
As	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcom
Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
Assignments	2	10% (10)	2 and 9	LO #3, #4 and #6, #7
Lab.		0%(0)		
Projects	1	10% (10)	13	LO #10
Midterm Exam	2hr	20% (10)	12	LO #1 - #7
Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)		

Note: The left column contains merged labels: "ormative assessm" (formative assessment) spanning Quizzes, Assignments, Lab., Projects rows; and "mmative assessr" (summative assessment) spanning Midterm Exam, Final Exam rows.

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction on the main concept
Week 2	Calculate the frequency distribution
Week 3	the cumulative frequency distribution, the frequency distribution graph
Week 4	the measures of central tendency
Week 5	the measures of variation
Week 6	the basic interpretations of probability. the concept of sample space, event, complement of event.
Week 7	the addition role of probability.
Week 8	The multiplication role of probability, dependent and independent event.
Week 9	Condition probability
Week 10	Bayes rule
Week 11	Permutation and Combination

Week 12	Midterm Exam
Week 13	Statistical probability distribution
Week 14	Continues distributions
Week 15	Give the marks to the students
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ementary statistics : a step by step approach / Allan Bluman. — 8t bility, statistics, and random processes for electrical engineering / Leon-Garcia. -- 3rd ed	Yes
Recommended Text	N.A.	N.A.
Websites	/https://www.studysmarter.co.uk/explanations/math/probability-and-statistics	

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