نموذج وصف البرنامج الأكاديمي باللغة العربية والإنكليزية
جامعة بابل - كلية الهندسة – المسيب - قسم هندسة الطاقة والطاقات المتجددة

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة بابل
الكلية/ المعهد: كلية الهندسة - المسيب
القسم العلمي: قسم هندسة الطاقة والطاقات المتجددة
اسم البرنامج الأكاديمي: برنامج أكاديمي للحصول على شهادة جامعية أولية، بكالوريوس علوم في هندسة الطاقة والطاقات المتجددة.
اسم الشهادة النهائية: بكالوريوس علوم في هندسة الطاقة والطاقات المتجددة
النظام الدراسي: مسار بولونيا
تاريخ اعداد الوصف: (٢٠٢٣/٤/٩)
تاريخ ملئ الملف: (٢٠٢٦/5/٣)

تم اعداد هذا الملف من قبل منسق ضمان الجودة في قسم هندسة الطاقة والطاقات المتجددة، والمنسق هنا لجنة وليس شخص، وقد تم تشكيلها بالأمر الإداري د/٣١٢٤/٨ في ٢٠٢٥/١٠/١٤. وتتكون من **(أ. م. د. حسين علي حسن** رئيساً، وعضوية كل من **م. م اماني ياسين طه، م. مهندس ضحى هاني مزهر، الأنسة سبأ حيدر كاظم).**

توقيع رئيس لجنة ضمان الجودة في قسم هندسة الطاقة والطاقات المتجددة **(أ. م. د. حسين علي حسن):**
التاريخ: ٢٠٢٦/٥/٣

توقيع مدقق الملف مدير شعبة ضمان الجودة والأداء الجامعي في الكلية **(م.م. عباس راشد هاتف):**
التاريخ: ٢٠٢٦/٥/٣

توقيع رئيس القسم **(أ.م. د. علي جابر عبد الحميد):**
التاريخ: ٢٠٢٦/٥/٣

توقيع معاون العميد العلمي **(أ. م. د. سناء عبد الرزاق جاسم):**
التاريخ: ٢٠٢٦/٥/٣

مصادقة السيد العميد

التوقيع:
(أ.م.د. وسام جليل خضير)
التاريخ: ٢٠٢٦/٥/٣

١. رؤية البرنامج

الريادة في التعليم والتعلم الهندسي في هندسة مجال الطاقة والطاقات المتجددة والبحث العلمي في نفس المجال محليا وعالميا مع تقديم الخدمات المجتمعية وتلبية احتياج سوق.

٢. رسالة البرنامج

المشاركة الفاعلة والمميزة في النهوض بمجال هندسة الطاقة والطاقات المتجددة من خلال رفد سوق العمل والمجتمع بكوادر هندسية كفؤة في هذا المجال و يتمتعون بمهارة و بأخلاق مهنة عالية، واصدار بحوث علمية تطبيقية رصينة في مجال التخصص.

٣. اهداف البرنامج

١. إعداد مهندسين أكفاء يمتلكون المعارف والمهارات العلمية والعملية في مجالات هندسة الطاقة التقليدية والمتجددة بما يؤهلهم لممارسة المهنة بكفاءة وتلبية احتياجات سوق العمل.

٢. المساهمة في التنمية المستدامة من خلال إجراء البحوث التطبيقية وتقديم الاستشارات العلمية والفنية والتعاون مع المؤسسات الصناعية والبحثية محليًا ودوليًا.

٣. تعزيز التعليم المستمر والتطوير المهني عبر التدريب، الندوات، والدورات العلمية، وتشجيع البعثات والدراسات العليا لمواكبة التطورات العالمية.

٤. دمج التكنولوجيا الحديثة وخاصة النظم المعلوماتية في المناهج الدراسية والأساليب البحثية لرفع جودة التعليم والبحث إلى المستويات العالمية

٤. الاعتماد البرامجي

هل البرنامج حاصل على الاعتماد البرامجي؟ ومن اي جهة؟
تم تقديم طلب الحصول على الاعتماد الى المجلس العراقي لاعتماد التعليم الهندسي

٥. المؤثرات الخارجية الأخرى

هل هناك جهة راعية للبرنامج؟
الدعم الحكومي (وزارة التعليم العالي والبحث العلمي)

٦. هيكلية البرنامج

هيكل البرنامج	عدد المقررات	وحدة دراسية	النسبة المئوية	ملاحظات *
متطلبات المؤسسة	٩	١٨	7.5%	اساسي

متطلبات الكلية	٣	١٨	7.5%	اساسي
متطلبات القسم	٤١	٢٠٤	85%	اساسي
التدريب الصيفي	-	-	-	-
أخرى				

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

٧. وصف البرنامج

السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة	
			نظري	عملي
المرحلة الأولى/ الكورس الأول	ERE1101	Engineering Drawing and Auto-CAD I	٤	٢
السنة / المستوى	ERE1102	Electrical Circuits	٣	٢
	ENM1102	Mathematics I	٤	٠
	ENM1101	Physics	٢	٢
	UOBABb4	Fundamental of Computer	١	٢
	UOBAB0301016	Arabic Language	٢	٠
السنة / المستوى	**رمز المقرر أو المساق**	**اسم المقرر أو المساق**	**الساعات المعتمدة**	
			نظري	**عملي**
المرحلة الأولى/ الكورس الثاني	ERE1211	Engineering Drawing and Auto-CAD II	3	٢
	ERE1202	Engineering Mechanics	5	٠
	ENM1213	Mathematics II	٤	٠
	ERE1203	Manufacturing Processes & Engineering Workshop	1	٢
	ERE1204	Chemistry	٢	٢
	UOBABb1101	English Language I	٢	٠
	UOBAB1104	Human Rights and Democracy	2	0
السنة / المستوى	**رمز المقرر أو المساق**	**اسم المقرر أو المساق**	**الساعات المعتمدة**	
			نظري	**عملي**
المرحلة الثانية/ الكورس الاول	ERE2311	Thermodynamics I	3	٢
	ERE2312	Fluid Mechanics I	٣	٢
	ERE2313	Engineering Mathematics	3	٠
	ERE2304	Strength of Materials	3	2
	ERE2305	Material Science	2	0
	UOBAB2302	English Language II	2	0
	UOBAB2301	Al-Ba’ath party crimes	2	0
السنة / المستوى	**رمز المقرر أو المساق**	**اسم المقرر أو المساق**	**الساعات المعتمدة**	
			نظري	**عملي**
المرحلة الثانية/ الكورس الثاني	ERE2411	Thermodynamics II	3	٢
	ERE2412	Fluid Mechanics II	3	2
	ERE2403	Electronic Circuits	2	٢
	ERE2404	Principles of Energy Engineering	4	0
	ERE2416	Engineering Mathematics II	4	0

1	1	Computer Programming (MATLAB)	ERE2405	
2	1	Computer Science II	UOBAB2004	
0	2	Arabic Language II	UOBAB2001	
الساعات المعتمدة		**اسم المقرر أو المساق**	**رمز المقرر أو المساق**	**السنة / المستوى**
عملي	**نظري**			**المرحلة الثالثة/ الكورس الاول**
٢	٣	Heat and Mass Transfer I	Em En Hti 303501 (2+2)	
٠	٣	Engineering Analysis	Em En Eai 303402 (2+0)	
٠	٣	Mechanical Element Design	Em En Mdi 303503 (2+0)	
٢	٢	Electrical Machines	Em En Emi 303604 (2+2)	
٠	٣	Fuels and Combustion Energy	Em En Fci 303705 (2+0)	
٠	٣	Electrical Power Systems I	Em En Epi 303806 (2+0)	
٠	٢	Waste Management and Energy Recovery	Em En Wmi 303907 (2+0)	
٢	٣	Energy Storage Systems	Em En Wmi 304008 (2+0)	
٠	٢	English III	Em En Ei 304917(2+0)	
الساعات المعتمدة		**اسم المقرر أو المساق**	**رمز المقرر أو المساق**	**السنة / المستوى**
عملي	**نظري**			**المرحلة الثالثة/ الكورس الثاني**
٢	٣	Heat and Mass Transfer II	Em Ht Maii 304109 (2+2)	
٠	٣	Numerical Analysis	Em En Naii 304210 (2+0)	
٠	٣	Mechanical System Design	Em En Mdii 304311 (2+0)	
٢	٢	Solar Energy	Em En Seii 304412 (1+2)	
٢	٢	Internal Combustion Engines	Em En Icii 304513 (2+2)	
٠	٣	Electrical Power Systems II	Em En Epii 304614 (2+0)	
٠	٣	Nanomaterials and Nanotechnology	Em En Nnii 304715 (2+0)	
٢	٢	Hydrogen Energy and Fuel Cell Technology	Em En Heii 304816 (1+2)	
الساعات المعتمدة		**اسم المقرر أو المساق**	**رمز المقرر أو المساق**	**السنة / المستوى**
عملي	**نظري**			**المرحلة الرابعة/ الكورس الاول**
٢	٣	Instrumentation in Energy Systems	Em En Iei 404901 (2+2)	
٠	٢	Energy Management and Economics	Em En Eei 405002 (2+0)	
٢	٣	Power Electronics	Em En Pei 405103 (2+2)	
٠	٣	Design of Renewable Energy Systems I	Em En Dri 405204 (2+0)	
٠	٣	Power Plants I	Em En Ppi 405305 (2+0)	
٢	٢	Bioenergy	Em En Bei 405406 (1+2)	
٠	٣	Nuclear Engineering	Em En Nei 405507 (2+0)	
٠	٢	Graduation Project I	Em En Gpi 405608 (2+0)	
الساعات المعتمدة		**اسم المقرر أو المساق**	**رمز المقرر أو المساق**	**السنة / المستوى**
عملي	**نظري**			**المرحلة الرابعة/ الكورس الثاني**
٢	٣	Control in Energy Systems	Em En Csii 405709 (3+0)	
٠	٢	Energy and Environment	Em En Eeii 405810 (2+2)	
٠	٢	Industrial Engineering	Em En Ieii 405911 (2+0)	
٠	٣	Design of Renewable Energy Systems II	Em En Drii 406012 (2+0)	
١	٣	Power Plants II	Em En Ppii 406113 (1+2)	
٢	٢	Wind Energy	Em En Weii 406214 (1+2)	

	Em En Msii 406315 (2+0)	Modeling and Simulation of Energy Systems	٢	٢
	Em En ElV 101616 (2+0)	English Language IV	٢	٠
	Em En Gpii 406416 (1+2)	Graduation Project II	٢	٠

٨. مخرجات التعلم المتوقعة للبرنامج

المعرفة	
مخرجات التعلم ١	القدرة على تحليل اداء محطات توليد القدرة الكهربائية الحرارية والغازية من خلال القدرة على تمييز وتحديد وتعريف وصياغة وحل المشكلات الهندسية بتطبيق مبادئ الهندسة والعلوم والرياضيات.
مخرجات التعلم ٦	المعرفة والالمام بأهم التقنيات المستخدمة في تصميم وصناعة نظم انتاج الطاقة وذلك من خلال القدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.
المهارات	
مخرجات التعلم ٢	القدرة على انتاج تصاميم هندسية تلبي الاحتياجات المطلوبة المتمثلة بمتطلبات المواصفات العالمية لإنتاج الطاقة والطاقات المتجددة ومتطلبات سوق العمل واصحاب الشأن ضمن قيود نوع الاستخدام ومحددات اخرى من خلال عمليات التحليل والتركيب في عملية التصميم.
مخرجات التعلم ٣	القدرة على تقييم نظم توليد الطاقة والطاقات المتجددة وتأثيرها على مقدار التلوث البيئي من خلال القدرة على انشاء وتنفيذ القياسات والاختبارات المناسبة. والقدرة على تقييم انظمة التحكم وكفاءتها في محطات توليد القدرة وكذلك معرفة الطالب بعمل وتصميم هذه المحطات لضمان تحقيق متطلبات الجودة وتحليل النتائج والقدرة على الحكم الهندسي عليها للوصول الى الاستنتاجات
مخرجات التعلم ٧	القدرة على القيادة والادارة الفعالة لفرق العمل وتحديد الاهداف وفق الامكانيات والتخطيط الصحيح لتحقيقها والالتزام بمواعيد الانجاز وادارة المخاطرة وعدم التيقن.
القيم	
مخرجات التعلم ٤	القدرة على التواصل الفعال شفهيا مع مجموعة من الناس وتحريريا مع مختلف المستويات الادارية ولمختلف الاغراض.
مخرجات التعلم ٥	القدرة على إدراك المسؤوليات الاخلاقية والمهنية في القضايا الهندسية واصدار احكام سليمة تراعي العواقب المترتبة عليها في المجالات لمالية والبيئية والمجتمعية على مستوى العالم.

٩. استراتيجيات التعليم والتعلم

١- طريقة القاء المحاضرات.
٢- المجاميع الطلابية
٣- ورش العمل
٤- الرحلات العلمية لمتابعة الواقع العملي لطبيعة انتاج الطاقات المتجددة
٥- التعلم الالكتروني داخل وخارج الحرم الجامعي
٦- التعلم التجريبي

١٠. طرائق التقييم

الامتحانات، التقييم المستمر، التقارير، المحفزات، التغذية الراجعة من الطلاب

١١. الهيئة التدريسية

أعضاء هيئة التدريس

الرتبة العلمية	التخصص		المتطلبات/المهارات الخاصة (ان وجدت)		اعداد الهيئة التدريسية	
	عام	خاص			ملاك	محاضر
أستاذ مساعد علي جابر عبد الحميد-دكتوراه	عام				ملاك	
استاذ مساعد وسام جليل خضير-دكتوراه	عام				ملاك	
استاذ مساعد سناء عبدالرزاق جاسم-دكتوراه	عام				ملاك	
استاذ مساعد علي جاسم حسين-دكتوراه	عام				ملاك	
استاذ واثق ناصر حسين-دكتوراه	عام				ملاك	
استاذ مساعد حسين علي حسن-دكتوراه	عام				ملاك	
استاذ مساعد أوس اكرم-دكتوراه	عام				ملاك	
استاذ مساعد محمد علي محمد-دكتوراه	عام				ملاك	
استاذ مساعد أحمد وليد حسين- دكتوراه	عام				ملاك	
استاذ مساعد علي محمد مقداد-دكتوراه	عام				ملاك	
استاذ مساعد فؤاد عبد الامير خلف-دكتوراه	عام				ملاك	
مدرس محمد عبد الدائم-ماجستير	عام				ملاك	
مدرس مهند جابر ياسر-ماجستير	عام				ملاك	
مدرس مساعد عمر أحمد نعيم-ماجستير	عام				ملاك	
مدرس مساعد أحمد محمد مرزة-ماجستير	عام				ملاك	
مدرس مساعد ضي سعدي ناجي-ماجستير	عام				ملاك	
مدرس مساعد اماني ياسين طه-ماجستير	عام				ملاك	

التطوير المهني

توجيه أعضاء هيئة التدريس الجدد

يخضع أعضاء هيئة التدريس الجدد الى برنامج توجيهي متميز بدعم من الجامعة من خلال عقد دورات تدريبية يحاضر فيها أعضاء هيئة التدريس القدامى ذو الخبرة لتحقيق إمكاناتهم كأساتذة وباحثين ومبتكرين، يمكنهم من المشاركة والتواصل في بيئة إيجابية تساعدهم في الاندماج بمجتمع الجامعة، ويعرفهم على بيئة الجامعة بما في ذلك خصائصها وقيمها الأساسية والمسؤوليات المتعلقة بالحقوق والأداء.

التطوير المهني لأعضاء هيئة التدريس

يخضع الكادر التدريسي الى مجموعة من الأنشطة والفعاليات واللقاءات والتأهيل العلمي الذي تقدمه الجهة المعنية بالجامعة لإكساب منسوبيها في كافة البرامج مزيدا من المعارف والمهارات والتقنيات المتصلة بممارسة أدوراه المهنية (التدريس، البحث العلمي، خدمة المجتمع) تحت عنوان التدريب والتطوير المهني لتحسين وتجويد مهارات ومعارف أعضاء هيئة التدريس والقيادات الأكاديمية في كافة المجالات التي تمكنهم من القيام بمهامهم المناطة بهم على أكمل وجه.

١. معيار القبول

مركزي ويشترط في الطالب الذم يقبل في الجامعات أن يكون:
١. عراقي الجنسية او مقيم بصفة دائمة في العراق.
٢. حائزا على شهادة الدراسة الاعدادية العراقية معززة بتصديق من المديرية العامة للتربية في المحافظة أو على شهادة تعادلها.
٣. ان يكون الطالب من مواليد ١٩٩٥ صعودا
٤. ناجحا في الفحص الطبي على وفق الشروط الخاصة بكل دراسة ويكون تقديم الطالب المكفوف (الذي تتوافر فيه شروط التقديم للدراسات الانسانية الملائمة عن طريق القبول المركزي).
٥. متفرغا للدراسة ولا يجوز الجمع بين الوظيفة والدراسة (في الوقت ذاته) في الكليات والمعاهد الصباحية ويشمل ذلك منتسبي المؤسسات الحكومية كافة ويشترط في استمرارهم بالدراسة الصباحية الحصول على اجازة دراسية من دوائرهم ابتداءا على وفق التعليمات النافذة؛ ولا يجوز الجمع بين دراستين ايضا وفي حال ثبوت خلاف ذلك يكتب الى الوزارة لإلغاء قبوله.
٦. من خريجي:
أ- السنة الدراسية الحالية.
ب- السنة الدراسية السابقة من غير المقبولين قبولا مركزيا في اية كلية او معهد ويتم قبولهم على وفق الحدود الدنيا لسنة تخرجهم.
٧. الطلبة غير العراقيين الحاصلين على شهادة الإعدادية العراقية والمقبولين مركزيا يتم ابلاغهم خطيا بمراجعة قسم القبول المركزي / شعبة الوافدين لبيان اعفائهم أو مطالبتهم بالأجور الدراسية بالعملة الاجنبية بحسب الضوابط الواردة في الفصل السابع.
٨. الطلبة العراقيين الذين تخرجوا من مدارس في خارج العراق, وتتم معادلة شهاداتهم الاجنبية في وزارة التربية ويتم قبولهم على ضوء معدلاتهم ضمن انسيابية القبول المركزي.

١٢. أهم مصادر المعلومات عن البرنامج

الموقع الالكتروني للكلية والجامعة
دليل الجامعة
أهم الكتب والمصادر الخاصة بالقسم

1. Control Engineering, Uday A. Bakshi and Varsha U. Bakshi, Technical Publications, Pune
2. Control Engineering, D. Ganesh Rao and K. Channa Venkatesh, Sanguine Technical Publishers, Bangalore

١. خطة تطوير البرنامج

تتضمن خطط التحسين الواقعية المستمدة من النظر في الأدلة والتقييمات المتوافرة. وقد يتم تطبيقها لأكثر من سنة واحدة إلا انه يتم إعدادها ومراجعتها كل سنة على مستوى المقررات والبرامج الأكاديمية والمؤسسة التعليمية.

مخطط مهارات البرنامج											
			مخرجات التعلم المطلوبة من البرنامج								
السنة / المستوى	رمز المقرر	اسم المقرر	اساسي أم اختياري	المعرفة		المهارات			القيم		
				١	٢	١	٢	٣	١	٢
المرحلة الاولى/الفصل الاول	ERE1101	Engineering Drawing and Auto-CAD I	اساسي	*	*	*	*	*		
	ERE1102	Electrical Circuits		*	*		*	*	*	*
	ENM1102	Mathematics I		*	*	*	*	*		
	ENM1101	Physics		*	*	*	*	*	*	*
	UOBABb4	Fundamental of Computer		*	*	*	*	*	*	*
	UOBAB0301016	Arabic Language		*	*	*	*	*		
المرحلة الاولى/الفصل الثاني	ERE1211	Engineering Drawing and Auto-CAD II	اساسي	*	*	*	*	*		
	ERE1202	Engineering Mechanics		*	*	*	*	*	*	*
	ENM1213	Mathematics II		*	*	*	*	*		
	ERE1203	Manufacturing Processes & Engineering Workshop		*	*	*			*	*
	ERE1204	Chemistry		*	*		*	*	*	*
	UOBABb1101	English Language I		*	*	*	*	*		
	UOBAB1104	Human Rights and Democracy						*	*	*
المرحلة الثانية/الفصل الاول	ERE2311	Thermodynamics I	اساسي	*	*	*	*	*		
	ERE2312	Fluid Mechanics I		*	*	*	*	*	*	*
	ERE2313	Engineering Mathematics		*	*	*	*	*		
	ERE2304	Strength of Materials		*	*	*			*	*
	ERE2305	Material Science		*	*		*	*	*	*

		*	*	*	*	*		English Language II	UOBAB2302	
*	*	*						Al-Ba’ath party crimes	UOBAB2301	
			*	*	*	*	اساسي	Thermodynamics II	ERE2411	المرحلة الثانية/الفصل الثاني
*	*	*	*	*	*	*		Fluid Mechanics II	ERE2412	
	*		*	*	*	*		Electronic Circuits	ERE2403	
	*			*	*	*		Principles of Energy Engineering	ERE2404	
*				*		*		Engineering Mathematics II	ERE2416	
*		*	*		*	*		Computer Programming (MATLAB)	ERE2405	
	*	*			*	*		Computer Science II	UOBAB2004	
*	*	*						Arabic Language II	UOBAB2001	
		*	*	*	*	*	اساسي	Heat and Mass Transfer I	Em En Hti 303501 (2+2)	المرحلة الثالثة/الفصل الاول
*	*	*	*		*	*		Engineering Analysis	Em En Eai 303402 (2+0)	
*	*	*	*		*	*		Mechanical Element Design	Em En Mdi 303503 (2+0)	
		*	*	*	*	*		Electrical Machines	Em En Emi 303604 (2+2)	
*	*	*	*	*	*	*		Fuels and Combustion Energy	Em En Fci 303705 (2+0)	
*	*	*	*	*	*	*		Electrical Power Systems I	Em En Epi 303806 (2+0)	
*	*			*	*	*		Waste Management and Energy Recovery	Em En Wmi 303907 (2+0)	
		*	*	*	*	*		Energy Storage Systems	Em En Wmi 304008 (2+0)	
		*	*	*	*	*	اساسي	Heat and Mass Transfer II	Em Ht Maii 304109 (2+2)	

*	*	*	*		*	*		Numerical Analysis	Em En Naii 304210 (2+0)	المرحلة الثالثة/الفصل الثاني
*	*	*	*		*	*		Mechanical System Design	Em En Mdii 304311 (2+0)	
		*	*	*	*	*		Solar Energy	Em En Seii 304412 (1+2)	
*	*	*	*	*	*	*		Internal Combustion Engines	Em En Icii 304513 (2+2)	
*	*	*	*	*	*	*		Electrical Power Systems II	Em En Epii 304614 (2+0)	
*	*			*	*	*		Nanomaterials and Nanotechnology	Em En Nnii 304715 (2+0)	
		*	*	*	*	*		Hydrogen Energy and Fuel Cell Technology	Em En Heii 304816 (1+2)	
*	*	*	*	*	*	*	اساسي	Instrumentation in Energy Systems	Em En Iei 404901 (2+2)	المرحلة الرابعة/الفصل الاول
*	*	*	*		*	*		Energy Management and Economics	Em En Eei 405002 (2+0)	
*	*	*	*		*	*		Power Electronics	Em En Pei 405103 (2+2)	
		*	*	*	*	*		Design of Renewable Energy Systems I	Em En Dri 405204 (2+0)	
*	*	*	*	*	*	*		Power Plants I	Em En Ppi 405305 (2+0)	
*	*	*	*	*	*	*		Bioenergy	Em En Bei 405406 (1+2)	
*	*			*	*	*		Nuclear Engineering	Em En Nei 405507 (2+0)	
		*	*	*	*	*		Graduation Project I	Em En Gpi 405608 (2+0)	
*	*			*	*	*		Control in Energy Systems	Em En Csii 405709 (3+0)	

*	*	*	*	*	*	*	اساسي	Energy and Environment	Em En Eeii 405810 (2+2)	**المرحلة الرابعة/الفصل الثاني**
*	*	*	*	*				Industrial Engineering	Em En Ieii 405911 (2+0)	
*	*			*	*	*		Design of Renewable Energy Systems II	Em En Drii 406012 (2+0)	
*	*			*	*	*		Power Plants II	Em En Ppii 406113 (1+2)	
*	*	*	*					Wind Energy	Em En Weii 406214 (1+2)	
*	*	*	*	*	*	*		Modeling and Simulation of Energy Systems	Em En Msii 406315 (2+0)	
*	*				*	*		Graduation Project II	Em En Gpii 406416 (1+2)	

- **يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقيي**

نموذج وصف المقرر

المرحلة الأولى/٢٠٢٥

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing and Auto-CAD I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**ERE1101**				
ECTS Credits	**6**				
SWL (hr/sem)	١٥٠				
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Ali Mohammed Moqdad		**e-mail**	ali.ijam@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Develop proficiency in *technical communication* and production of mechanical engineering drawings. 2. Develop skills in the preparation of working and assembly mechanical drawings. 3. *Develop an understanding of the properties, uses and production of materials used in the* manufacture of engineering components. 4. Provide knowledge of the different methods of production of engineering components. 5. *Develop skills in communicating technical information using illustrations, scaled models and working drawings* to solve engineering *design* problems. 6. Develop skills in applying and drawing principles to facilitate product development and manufacture. 7. Develop *proficiency* in the use of Computer-Aided Drafting (CAD) software, *instruments, media and reference materials* to produce engineering drawings. 8. Develop an interest in mechanical engineering as disciplines and careers. *9. Develop the capacity for critical and creative thinking, problem-solving, leadership and cooperative behaviors through authentic learning experiences.*

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know the principles of Lettering and Dimensioning. 2. Know how to construct standard engineering curves. 3. Know how to construct a number of different geometrical constructions. 4. Know how to project solids in orthographic projection. 5. Know how to use Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures "different lines"). 6. Know how to use Computer-Aided Drafting software to produce drawings (different two-dimensional figures "surfaces").
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.**[150] • Drawing Instruments and Accessories. [12 hrs.] • Lettering and Dimensioning Practices. [12 hrs.] • Geometrical Constructions. [46 hrs.] • Orthographic Projections. [40 hrs.] • Computer-Aided Drafting software (two-dimensional figures). [40 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	95	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	4	5% (20)	5 and 10	LO #3, #4, #5, and #6
	Class Assignment	15	1.5% (22.5)	Continuous	All
	Home work	15	0.5% (7.5)	Continuous	LO #3, #5 and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Drawing instruments and accessories, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures "different lines").
Week 2	Lettering and dimensioning practices, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures "different lines").
Week 3	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures "different lines").

Week 4	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 5	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 6	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 7	Geometrical constructions, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 8	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 9	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 10	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 11	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 12	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 13	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 14	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 15	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Drawing instruments and accessories, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 2	Lettering and dimensioning practices, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 3	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 4	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 5	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 6	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 7	Geometrical constructions, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 8	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 9	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 10	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 11	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 12	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 13	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 14	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 15	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering drawing, Abdul Rasoul Al Khafaf, University of Technology, Baghdad, Iraq, 1990.	Yes
Recommended Texts	Handbook of engineering drawing and AutoCAD, Mohammad Abid Muslim Altufaily, University of Babylon, Iraq, 2007	Yes
Websites	https://youtu.be/zL1BA-mcjcc	

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 Information معلومات المادة الدراسية					
Module Title	**Electrical Circuits**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**ERE1102**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Mohammed Ali Al-Shuraifi		**e-mail**	Msb.Mohammed.Ali@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To study Ohm's law 2. To study electrical circuits; series, parallel, and series-parallel in d.c. 3. To apply a methods of analysis on d.c. circuits 4. To apply electrical theorems on d.c. circuits 5. To understand the sinusoidal waveforms in electrical circuits. 6. To understand the response of Capacitor, Inductor, and resistor. 7. To understand the complex numbers. 8. To perform conversion between time domain and phasor domain and vice versa. 9. To apply the methods of analysis in ac circuits 10. To apply the circuit theorems in ac circuits 11. To understand power in ac circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Studying ohm's law 2. Studying types of circuits in d.c. and methods to analyze them. 3. Recognize ac components and their response; capacitor, inductor, and resistor. 4. List the various terms associated with a.c. electrical circuits. 5. Understand complex numbers in order to apply them in ac circuits 6. Discuss the average and the rms values. 7. Apply Kirchhoff's laws on ac circuits 8. Understand methods of analysis in ac circuits 9. Apply electrical theorems in ac circuits.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. <u>Part A - Circuit Theory</u> • studying d.c. electrical circuits. [12 hrs] • analyzing d.c. electrical circuits.[13 hrs] • Sinusoidal waveforms, average (dc) value, effective (rms) value [8 hrs] • Time domain and phasor domain. [8 hrs] • Complex numbers: rectangular and polar form [8 hrs] • Methods of circuit analysis and their applications on ac circuits; mesh and nodal methods. [12 hrs] • Electrical circuit theorems and their application on ac circuits: Superposition , Thevenin, And Norton. [12 hrs] • Power in ac circuits: power triangle, real power, reactive power, and apparent power; impedance triangle. [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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)	93	**Structured SWL (h/w)**	5

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٢hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Dc circuits; series , parallel , series-parallel
Week 2	Methods of analyzing d.c. circuits
Week 3	Electrical theorems
Week 4	Review of Kirchhoff's Laws on ac circuits
Week 5	Star delta and delta star conversion in ac circuits
Week 6	RLC circuits
Week 7	Mid-term Exam
Week 8	Series and parallel circuits
Week 9	Series – parallel circuits in ac circuits
Week 10	Methods of analysis in ac circuits I
Week 11	Methods of analysis in ac circuits II
Week 12	Electrical theorems in ac circuits I
Week 13	Electrical theorems in ac circuits II
Week 14	Power and power triangle
Week 15	Power , apparent power , reactive and real power
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: series-parallel dc circuits
Week 2	Lab 2: Norton's theorem
Week 3	Lab 3: RLC circuits
Week 4	Lab 4: Kirchhoff's laws
Week 5	Lab 5: mesh method
Week 6	Lab 6: superposition theorem
Week 7	Lab 7: Thevenin theorem

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introductory circuit analysis by Boylestad	Yes
Recommended Texts	Introductory circuit analysis by Boylestad	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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 Information معلومات المادة الدراسية					
Module Title	**Mathematics I**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ENM1102**			☐ **Lecture**	
ECTS Credits	**6**			☐ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	One		
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Mohammed Abd Aldeem	**e-mail**	met.moh.abdaldaaem@uobabylon.edu.iq		

Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	MSC
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**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	**After completing the course, students should be able to**: 1) Enable the pupil to learn the concepts of mathematics and applications in his work. 2) To study the characteristics and properties of number sets, and obtain the number systems. 3) To understand the concept of function, to learn draw the graph of functions, to know the lists types of functions. 4) Study the meaning of limit and continuous function. 5) To understand the meaning of derivative function and applications. 6) Study the transcendental function. 7) Study the Unit vector, vector equation, cross product, dot product. 8) To knows the meaning of complex number.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) Describe the characteristics and properties of number sets, and obtain the number systems. 2) Describe and State the concept of function, draw the graph of functions, the lists types of functions. 3) To understands the meaning of limit and continuous function. 4) To knows the meaning of derivative function and applications. 5) Describe the transcendental function. 6) Describe the matrix and its operations and to know the determent of its. 7) Describe the Unit vector, vector equation, cross product, dot product. 8) To understands the meaning of complex number.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Type of sets, type of interval, Cartesians plain. The domain and rang of functions, even and odd functions. Drawing curved function, shifting the graph. limit from the left and right. [20 hr] • The concept of continuous function, Algebraic operations on continuous functions. Methods of derivation, the chain rule. Applications on derivatives. Kind of exponential functions. Types of trigonometric functions. The inverse of the trigonometric functions. Kind of Hyperbolic functions. [20 hr] • Types of matrices, operations on matrices. Use matrices in solving linear systems of equations. Meaning vector, algebraic properties of vectors. Vector equation, cross product, dot product. Properties of complex numbers, the representation of the complex number. [20 hr]

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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7,#8
	Projects				
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	System numbers.
Week 2	The functions and its kinds.
Week 3	The graph of the function.
Week 4	Limit function.
Week 5	Continuous functions.
Week 6	Derivatives.
Week 7	Applications on derivatives. (Mid-term Exam)
Week 8	Exponential functions.
Week 9	The inverse trigonometric functions.
Week 10	Hyperbolic functions.
Week 11	Matrices and their types.
Week 12	Solving systems of linear equations.
Week 13	Vectors.
Week 14	The operations on the Vector.
Week 15	Complex numbers.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr, Weir Joel R. Hass ‘Calculus’ (V.12), 2014**.**	Yes
Recommended Texts	1. Haward Anton" Calculus and analytic geometry". 2. Schoms series " Theory and problems of calculus".	No
Websites		

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

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

Module Information معلومات المادة الدراسية					
Module Title	**Physics**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ENM1101**			☐ **Lecture**	
ECTS Credits	**5**			☒ **Lab**	
SWL (hr/sem)	**125**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Hussein Ali Hassan				
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Analyze the atomic structure of matter at its most fundamental. 2. Recognize the state of matter and its properties. 3. Understand the forms of energy. 4. Solve problems that call for the application of conservation of energy. 5. Know the classification of the semiconductors and the mechanism behind them. 6. Explain the basic properties of light and describe some of its applications in engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concepts and definitions is important in any field of study. 2. Learning the properties of individual atoms and molecules, as well as how they interact with each other. 3. knowing the physical and chemical properties of each state, such as gas, liquid, and solid, as well as understanding how the atoms and molecules interact with each other in the various states. 4. Be familiar with how the forms of energy interact with one another and how they are used. 5. Understanding how energy can be converted from one form to another as well as familiarity with the equations involved. 6. Learning how semiconductors are classified and what the mechanisms are behind each type of semiconductor. 7. Applying the light fundamental principles and how engineers are able to create complex technological solutions.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Some basic concepts and definitions, how atomic structure is formed and interatomic bonding energy and classification, properties of matter, state of matter, energy sources, kinetic energy, and work. [23 hr] • Potential energy, thermal properties of matter, how heat and law of thermodynamics applied, what are the fluid characteristics, electric field, and potential. [22 hr] • Classifications of Conductor and insulator materials, semiconductors, propagation of light and optics characteristics, and elements of solid-state physics. [15 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will be taught in such a way that students will be compelled to participate in the exercises and their critical thought skills will be refined and expanded through participation. Classes and interactive tutorials will be used in order to reach this goal, as well as considering the types of simple experiments involving sampling activities that the learners might find interesting as well. The module will also include group activities, which will encourage collaboration and the exchange of ideas. This will help to create an engaging learning experience for the students and will also help them to develop their communication skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	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%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Some basic concepts and definitions
Week 2	Atomic structure and interatomic bonding
Week 3	Properties of matter
Week 4	State of matter
Week 5	Energy sources
Week 6	Kinetic Energy and work
Week 7	Potential energy (Mid-term Exam)
Week 8	Thermal properties of matter
Week 9	Heat and law of thermodynamics
Week 10	Fluids
Week 11	Electric field and potential
Week 12	Conductor and insulator materials
Week 13	Semiconductors
Week 14	Lights and optics
Week 15	Elements of solid-state physics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Photon energy
Week 2	Lab 2: Data analysis for calculating Plank's constant
Week 3	Lab 3: Energy distribution
Week 4	Lab 4: Electrical properties of insulated materials
Week 5	Lab 5: Light interaction with matter

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Halliday, D., Resnick, R., & Walker, J. (2013). Fundamentals of physics. John Wiley & Sons.	Yes
Recommended Texts	Radi, H., & Rasmussen, J. O. (2013). Principles of physics. Springer.	Yes
Websites		

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

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

Module Information معلومات المادة الدراسية					
Module Title	**Fundamental of Computer**			**Module Delivery**	
Module Type	**B**			☒ **Theory**	
Module Code	**UOBABb4**			☐ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Omar Ahmed Naeem	**e-mail**	msb.omar.alkawak@uobabylon.edu.iq		
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.		
Module Tutor		**e-mail**			
Peer Reviewer Name	None	**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The computer science curriculum aims to introduce the student to computer science and the skills related to this subject. The main purpose of the course is to introduce the student to an idea about the computer and its components and how each of its parts works through an explanation of the input units, the central processing unit, the input units, the storage units, and the types of operating systems and programs Microsoft Office and how to connect to the Internet and identify and protect against virus risks.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive objectives A1- During the school year, the student learns the basics of computer science. A2- Enabling the student to know the main principles of the most prominent concepts of computer science, their sources and types, and the mechanisms used for their purpose. A 3- Enabling the student to know all the basics that he uses in the scientific subject A 4- Definition of computer, its development history and generations A 5- An explanation of the computer system with all its elements and systems A6- Introducing the student to the input unit, its principles of work, its types, and the work of the basic office programs A 7- The central processing unit, its parts, how each part works, the output unit, its working principles and types b- The skill objectives of the subject B1 - Familiarity with developments in the field of computers B2 - Familiarity with computer components B3 - Enabling the student to understand every part of the computer, how it works, and the work of the basic office programs B4- Giving the student an opportunity to explain a small part of the class to his classmates to enhance his self-confidence. B5- Solve a small part of the homework to urge the students to complete the solution, give class assignments, and make groups to solve these assignments.
Indicative Contents المحتويات الإرشادية	The students will be able to identify the values, trends and patterns of behavior that uphold the ethics of the profession and work to adhere to them after graduation. 1-Urging the student to understand the objective of studying the subject in general. 2-Urging the student to think about how to develop oneself in the field of computers. 3 -Making the student able to deal with the computers and how to use the programs in accordance with the rules and regulations of engineering.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. The teacher prepares lectures on the subject in soft electronic form and presents them to the students. 2. The teacher gives lectures in detail. 3. the teacher requests periodic reports and homework on the basic subjects of the subject. 4. Academic methods and lectures 5. Dialogue modalities 6. Use projectors 7. Providing the student with basic and secondary topics related to computer work 8. Translating theoretical topics and vocabulary related to computer technologies 9. Requiring the student to follow developments in computer science

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3 and 15	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 15	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%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computers: their generations, components: hardware and software
Week 2	(Input and output) (system software and application software).
Week 3	Windows operating system Windows concept, advantages, basic requirements
Week 4	Windows The concept of a window for any program and identifying its main components, folders, and files and how to deal with them
Week 5	Windows Learning about My Computer and Control Panel components
Week 6	Output devices such as (printer and ways to deal with it)
Week 7	Word (document building and formatting methods)
Week 8	Word (document building and formatting methods)
Week 9	**Midterm Exam**
Week 10	Excel program (data building, processing, and ways to extract it)
Week 11	Excel program (data building, processing, and ways to extract it)
Week 12	PowerPoint program (building and coordinating presentations)
Week 13	PowerPoint program (building and coordinating presentations)
Week 14	The concept of computer viruses: how to infect, types and treatment
Week 15	The Internet: a definition of how to deal with the Internet, Internet browsers, web searches and e-mail
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Computers: their generations, components: hardware and software
Week 2	(Input and output) (system software and application software).
Week 3	Windows operating system Windows concept, advantages, basic requirements
Week 4	Windows The concept of a window for any program and identifying its main components, folders, and files and how to deal with them
Week 5	Windows Learning about My Computer and Control Panel components
Week 6	Output devices such as (printer and ways to deal with it)
Week 7	Word (document building and formatting methods)

Week 8	Word (document building and formatting methods)
Week 9	**Midterm Exam**
Week 10	Excel program (data building, processing, and ways to extract it)
Week 11	Excel program (data building, processing, and ways to extract it)
Week 12	PowerPoint program (building and coordinating presentations)
Week 13	PowerPoint program (building and coordinating presentations)
Week 14	The concept of computer viruses: how to infect, types and treatment
Week 15	The Internet: a definition of how to deal with the Internet, Internet browsers, web searches and e-mail
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Computer basics and office applications / 4 parts - Prof. Dr. Ghassan Hamid Abdel Majeed and Dr. Ziyad Muhammad Abboud and others.	No
Recommended Texts	1. William Stallings, Computer Organization & Architecture, Sixth edition, Person Education 2. Donald H. Sandersz, Computer today, Second edition, McGraw –hill 3. Lectures provided by the subject teacher 4. Books available in the college library	No
Websites		

Grading Scheme
مخطط الدرجات

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

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Module Information
معلومات المادة الدراسية

Module Title	**Arabic Language**	**Module Delivery**
Module Type	**B**	☒ **Theory**
Module Code	**UOBAB0301016**	

ECTS Credits	**2**	☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
SWL (hr/sem)	**50**	

Module Level	UGI	**Semester of Delivery**	One
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Noor Mohammed Jasim	**e-mail**	msb.noor.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title	Assist lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. اتقان اللغة: الهدف الرئيسي من أهداف الوحدة في اللغة العربية هو مساعدة المتعلمين على تطوير الكفاءة في القراءة والكتابة والتحدث والاستماع إلى اللغة العربية. وهذا يشمل تحسين المفردات والقواعد والنطق ومهارات الفهم. ٢. مهارات الاتصال: هدف آخر هو تعزيز قدرة المتعلمين على التواصل الفعال باللغة العربية. يتضمن ذلك التركيز على الاستخدام العملي للغة ، مثل الانخراط في المحادثات والتعبير عن الآراء وطرح الأسئلة والإجابة عليها والمشاركة في أنشطة التواصل المختلفة. ٣. التفاهم الثقافي: قد تهدف أهداف الوحدة أيضًا إلى تعزيز التفاهم الثقافي والوعي بالعالم العربي. ويشمل ذلك تعريف المتعلمين بالعادات والتقاليد والأدب والتاريخ والجوانب الاجتماعية المرتبطة بالدول الناطقة باللغة العربية. ٤. استخدام اللغة الوظيفية: يمكن أن يكون الهدف من أهداف الوحدة هو تزويد المتعلمين بالمهارات اللغوية اللازمة لأداء مهام أو وظائف محددة باللغة العربية. قد يتضمن ذلك تعلم المفردات والعبارات المتعلقة بموضوعات مثل السفر والتسوق وتناول الطعام والرعاية الصحية والتفاعلات التجارية. ٥. الدقة اللغوية: قد تؤكد أهداف الوحدة على تطوير الدقة النحوية والاستخدام السليم للغة. يتضمن ذلك تعلم قواعد وهياكل قواعد اللغة العربية ، وبناء الجملة ، والصرف لإنتاج جمل متماسكة وخالية من الأخطاء. ٦. التعلم المستقل: هدف آخر هو تعزيز قدرة المتعلمين على دراسة واستكشاف اللغة العربية بشكل مستقل خارج الفصل الدراسي. يمكن أن يشمل ذلك تشجيع التعلم الذاتي ، وتوفير الموارد لمزيد من الممارسة ، وتطوير استراتيجيات لاكتساب اللغة بشكل فعال. ٧. التقييم والتقدم: قد تهدف أهداف الوحدة أيضًا إلى تقييم تقدم المتعلمين وتقديم ملاحظات حول مهاراتهم في اللغة العربية. يسمح هذا لكل من المتعلمين والمدربين بتقييم إنجازاتهم وتحديد مجالات التحسين.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. الفهم السمعي: إظهار القدرة على فهم وفهم اللغة العربية المنطوقة عبر مجموعة من الموضوعات والسياقات ، بما في ذلك المحادثات والعروض التقديمية والتسجيلات الصوتية. ٢. الفهم القرائي: إظهار القدرة على قراءة وفهم النصوص العربية المكتوبة بمستويات مختلفة من الصعوبة ، مثل المقالات والقصص والمواد الأصلية ، واستخراج المعلومات ذات الصلة. ٣. إتقان التحدث: التواصل الفعال باللغة العربية من خلال التعبير عن الأفكار والآراء والمعلومات في شكل منطوق. الانخراط في المحادثات والمشاركة في المناقشات وتقديم العروض باستخدام المفردات والقواعد والنطق المناسب. ٤. إتقان الكتابة: إنتاج نصوص مكتوبة باللغة العربية ، مثل المقالات والتقارير ورسائل البريد الإلكتروني والرسائل ، بوضوح وتماسك ودقة نحوية. قم بتطبيق اصطلاحات اللغة المناسبة ، بما في ذلك التهجئة وعلامات الترقيم وبنية الفقرة.

٥. المفردات والقواعد: إظهار مجموعة واسعة من المفردات وفهم قواعد قواعد اللغة العربية وهياكلها. استخدم المفردات المناسبة للتعبير عن الأفكار والأفكار بدقة ، وتطبيق القواعد النحوية بشكل فعال في الاتصال الكتابي والمنطوق. ٦. الوعي الثقافي: إظهار فهم للجوانب الثقافية للبلدان الناطقة باللغة العربية ، بما في ذلك العادات والتقاليد والأعراف الاجتماعية. التعرف على الاختلافات الثقافية واحترامها وتطبيق المعرفة الثقافية بشكل مناسب في استخدام اللغة. ٧. الطلاقة اللغوية: تنمية الطلاقة في اللغة العربية من خلال التحدث والرد بشكل عفوي ، دون تردد مفرط. أظهر القدرة على الحفاظ على المحادثة والتفاوض بشأن المعنى والتعامل مع مواقف الاتصال المختلفة بثقة. ٨. التفكير النقدي: تطبيق مهارات التفكير النقدي لتحليل وتقييم النصوص العربية ، بما في ذلك المقالات الإخبارية ، والأعمال الأدبية ، والمواد الثقافية. صياغة الآراء ودعمها ، وإقامة الروابط ، وإظهار الفهم وراء مستوى الفهم السطحي. ٩. التعلم المستقل: تحمل مسؤولية التعلم الذاتي من خلال استخدام الموارد والاستراتيجيات لتطوير إتقان اللغة العربية. إظهار القدرة على الانخراط في التعلم الذاتي للغة والبحث عن فرص للتحسين المستمر. ١٠. التواصل بين الثقافات: الانخراط في التواصل الفعال بين الثقافات من خلال إظهار فهم الاختلافات الثقافية ، وتكييف استخدام اللغة وفقًا لذلك ، وإظهار الاحترام لوجهات النظر المتنوعة.	
المبتدأ والخبر أن يكون الطالب جملة فيها مبتدأ وخبر , التصويبات اللغويةأن يتعرف الطالب على التصويبات اللغوية علامات الترقيم أن يستعمل الطالب علامات الترقيم وجوب فتح همزه ان وكسرها أن يتعرف الطالب موقع فتح همزة ان وكسرها الادب القصصي أن يتعرف الطالب على الادب القصصي الادب العربي زيادة الثروة اللغوية للطالب الشعر الحر والشعر العمودي أن يفرق الطالب بين الشعر العمودي والحر العدد أن يكتب الطالب العدد بشكل صحيح حافظ ابراهيم أن يترجم الطالب لحياة الشاعر حافظ ابراهيم بدر شاكر السياب أن يترجم الطالب لحياة الشاعر بدر شاكر السياب الجواهري أن يترجم الطالب لحياة الشاعر الجواهري همزة القط أن يستخرج الطالب همزة القطع	**Indicative Contents** المحتويات الإرشادية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
النهج التواصلي: التأكيد على استخدام اللغة العربية للتواصل الهادف. شجع المتعلمين على الانخراط في محادثات حقيقية ولعب الأدوار وأنشطة التواصل التي تعكس مواقف الحياة الواقعية. توفير فرص للتفاعل الهادف باللغة العربية لتطوير مهارات التحدث والاستماع. المهارات المتكاملة: دمج المهارات اللغوية الأربع (الاستماع والتحدث والقراءة والكتابة) في عملية التدريس والتعلم. قم بإنشاء أنشطة تسمح للمتعلمين بممارسة هذه المهارات وتعزيزها في وقت واحد. على سبيل المثال ، قراءة نص بصوت عالٍ ومناقشته ثم كتابة رد. مواد أصلية: دمج المواد العربية الأصيلة ، مثل المقالات الإخبارية والأدب والأغاني ومقاطع الفيديو والبودكاست ، في المناهج الدراسية. تعرض هذه المواد المتعلمين لاستخدام اللغة الواقعية والجوانب الثقافية للمجتمعات الناطقة باللغة العربية ، مما يعزز كفاءتهم اللغوية وفهمهم الثقافي. التعلم السياقي: تعليم اللغة العربية في سياقات ذات مغزى تتعلق بحياة المتعلمين أو مجالات اهتمامهم. استخدم الموضوعات والموضوعات والمواقف ذات الصلة لجعل تجربة تعلم اللغة أكثر جاذبية ووثوقية للمتعلمين. مناهج متعددة الوسائط: استخدم مجموعة متنوعة من الموارد والوسائط لتلبية أنماط التعلم المختلفة. اجمع بين الأنشطة البصرية والسمعية والحركية لتعزيز تعلم اللغة. قم بدمج أدوات الوسائط المتعددة وتطبيقات تعلم اللغة والموارد عبر الإنترنت والأنشطة التفاعلية لإنشاء بيئة تعليمية جذابة. التعلم القائم على المهام: تنظيم تعلم اللغة حول المهام الهادفة التي تتطلب من المتعلمين استخدام اللغة العربية لتحقيق أهداف محددة. يمكن أن تشمل المهام التخطيط لرحلة أو وصف تجربة شخصية أو المشاركة في مناقشة. يعزز هذا النهج استخدام اللغة ومهارات حل المشكلات.	**Strategies**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٣٠	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٢٠	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	١
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٥٠		

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	أن يكون الطالب جملة فيها مبتدأ وخبر
Week 2	أن يتعرف الطالب على التصويبات اللغوية
Week 3	أن يستعمل الطالب علامات الترقيم
Week 4	أن يتعرف الطالب موقع فتح همزة ان وكسرها
Week 5	أن يتعرف الطالب على الادب القصصي
Week 6	الامتحان الفصلي
Week 7	زيادة الثروة اللغوية للطالب
Week 8	أن يفرق الطالب بين الشعر العمودي والحر
Week 9	أن يكتب الطالب العدد بشكل صحيح
Week 10	أن يترجم الطالب لحياة الشاعر حافظ ابراهيم
Week 11	أن يترجم الطالب لحياة الشاعر بدر شاكر السياب
Week 12	أن يترجم الطالب لحياة الشاعر الجواهري
Week 13	أن يستخرج الطالب همزة القطع
Week 14	أن يستعمل الطالب همزة الوصل
Week 15	أن يكون الطالب جملة فيها مبتدأ وخبر
Week 16	الامتحان النهائي

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	١- عليوي ، سعد حسن ، النحو الوسيط ، ط١ ، دار صفاء للنشر والتوزيع ، عمان –الاردن ، ٢٠١٥. ٢- النحوي ، ابن عقيل ، شـــرح ابن عقيل على الفية ابن مالك ، ط١ ، دار الكتب العلمية ، بيروت - لبنان ، ٢٠٠٦. ضيف ، شوقي ، تاريخ الادب العربي ، ط٢، دار المعارف للطباعة ، القاهرة ، ٢٠٠٦.	Yes
Recommended Texts	أ) الانصاري ، ابن هشام ، شرح قطر الندى وبل الصدى ، ط١ ، دار الهلال للنشر والتوزيع ، بيروت – لبنان ، ٢٠٠٩. ب) السامرائي ، فاضل صالح ، معاني النحو ، دار ابن كثير للنشر والتوزيع ، بيروت – لبنان ، ٢٠١٧.	No
Websites	وكيبيديا ، منتديات اللغة العربية	

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 Information
معلومات المادة الدراسية

Module Title	**Engineering Drawing and Auto-CAD II**	**Module Delivery**	
Module Type	**S**	☒ **Theory**	
Module Code	**ERE1211**	☐ **Lecture**	
ECTS Credits	**6**	☒ **Lab**	
SWL (hr/sem)	١٥٠	☐ **Tutorial**	
		☒ **Practical**	
		☐ **Seminar**	

Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohanad Jaber Yasir	**e-mail**	msb.mohanad.Yasir@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1)Develop proficiency in *technical communication* and production of mechanical engineering drawings. 2)Develop skills in the preparation of working and assembly mechanical drawings. 3)*Develop an understanding of the properties, uses and production of materials used in the* manufacture of engineering components. 4)Provide knowledge of the different methods of production of engineering components. 5)*Develop skills in communicating technical information using illustrations, scaled models and working drawings* to solve engineering *design* problems. 6)Develop skills in applying and drawing principles to facilitate product development and manufacture. 7)Develop *proficiency* in the use of Computer-Aided Drafting (CAD) software, *instruments, media and reference materials* to produce engineering drawings. *8)*Develop an interest in mechanical engineering as disciplines and careers. *9)Develop the capacity for critical and creative thinking, problem-solving, leadership and cooperative behaviors through authentic learning experiences.*

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Know how to represent solids in pictorial projections. • Know how to produce working and assembly drawings. • Know how to use Computer-Aided Drafting software to produce drawings (different three-dimensional figures "solid figures"). • Know how to project auxiliary views. • Know how to prepare drawings with sectional views.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**.[150] • Represent solids in pictorial projections. [20 hrs.] • Assembly drawings. [40 hrs.] • Project auxiliary views. [20 hrs.] • Prepare drawings with sectional views. [30 hrs.] • Computer-Aided Drafting software (three-dimensional figures). [40 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	80	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	4	5% (20)	5 and 10	LO #2, #4, and two in #5
	Class Assignment	15	1.5% (22.5)	Continuous	All
	Home work	15	0.5% (7.5)	Continuous	LO #3, #5 and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 2	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 3	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 4	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 5	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 6	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 7	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 8	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 9	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 10	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 11	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 12	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 13	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 14	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 15	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 2	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 3	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 4	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 5	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 6	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 7	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 8	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).

Week 9	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 10	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 11	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 12	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 13	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 14	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 15	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering drawing, Abdul Rasoul Al Khafaf, University of Technology, Baghdad, Iraq, 1990.	Yes
Recommended Texts	Handbook of engineering drawing and AutoCAD, Mohammad Abid Muslim Altufaily, University of Babylon, Iraq, 2007	Yes
Websites	https://youtu.be/eIPHvDcMx-w	

Grading Scheme
مخطط الدرجات

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

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

Module Information
معلومات المادة الدراسية

Module Title	**Engineering Mechanics**	**Module Delivery**
Module Type	**S**	

Module Code	**ERE1202**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
ECTS Credits	٦	
SWL (hr/sem)	١٥٠	

Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Bashar Abid Hamza	**e-mail**	met.basher.abid@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	After completing the course, students should be able to 1. Describe the characteristics and properties of forces and moments, analyze the force system, and obtain the resultant and equivalent force systems, 2. State the conditions of equilibrium, draw free body diagrams (FBDs), analyze and solve problems involving rigid bodies in equilibrium, 3. Draw FBDs, analyze and solve structural and mechanical systems of rigid bodies in equilibrium, 4. Draw FBDs, analyze and solve structural and mechanical systems with distributed loads in equilibrium, 5. Describe the mechanism and characteristics of dry friction, draw FBDs, analyze and solve structural and mechanical systems with friction in equilibrium, 6. Describe the physical meanings of idealized problems in Statics and approximate real-life Situations to idealized problems 6- Describe the equation of kinematics and solve problems. 7- Describe and analysis the equation of kinetics and solve problems.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To understand Principle engineering mechanics 2- enable student to study and analyze force systems 3- enable student to Modeling of supports and free body diagram 4- Enable student to study equilibrium of force systems applied on bodies. 5- Enable student to locate the centroid of area. 6- Enable student to determine the moment of inertia of area.

	7- Enable student to analyze and solve structural and mechanical systems with friction in equilibrium. 8- Enable student to compare between kinematics and kinetics of particles 9- Enable student to study and analysis kinematics (rectilinear/curvilinear motion). 10 - Enable student to study and analyze the kinetics of particles (equation of motion, work and energy , and impulse and momentum)
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction, perpendicular components of forces, moment and couple of forces and resultant of force system. **[١٦hrs.]** • Modeling of supports, Draw free body diagram. **[٥hrs.]** • Determination Centroid of lines, area, and volume using integration. **[٥hrs.]** • Determination Centroid of lines, area, and volume using tables. **[٣hrs.]** • Determination moment of inertia using integration. **[٣hrs.]** • Determination moment of inertia using tables. **[٣hrs.]** • Evaluation of friction forces.**[٥hrs.]**

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	٦٤	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٨٦	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٦
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	5% (5)	2 and 4	LO #1 and #2
	Assignments	2	5% (5)	4 and 8	LO #1 - #5
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**	2hr	30% (30)	4 and 8	LO #1 - #5
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Force 2D (perpendicular components)
Week 3	Force 2D (moment and couple)
Week 4	Force 2D (resultant)

Week 5	Equilibrium
Week 6	Centroid lines, area, and volume
Week 7	Centroid lines, area, and volume
Week 8	Moment of inertia
Week 9	Moment of inertia
Week 10	Friction
Week 11	Dynamics –Kinematics of particles –(1) –Rectilinear motion
Week 12	(2) Curvilinear Motion
Week 13	Kinetics of Particles –(1) Equation of Motion
Week 14	(2)- Work and Energy
Week 15	3- Impulse and Momentum.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	J. L. Meriam and L. G. Kraige, 'Engineering Mechanics: Statics (V.1), 7th edition, Wiley 2012.	Yes
Recommended Texts	R. C. Hibbeler, Engineering Mechanics: STATICS (SI Edition), 14th edition, Prentice Hall 2016.	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

Module Information
معلومات المادة الدراسية

Module Title	**Mathematic II**	**Module Delivery**
Module Type	**S**	☒ **Theory**
Module Code	**ENM1213**	

ECTS Credits	**6**	☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
SWL (hr/sem)	**150**	

Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohammed Abd Aldeem	**e-mail**	met.moh.abdaldaaem@uobabylon.edu.iq
Module Leader's Acad. Title	Assist . Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematic I	**Semester**	One
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 the course, students should be able to:

1) Enable the pupil to learn the concepts of mathematics and applications in his work.
2) To study the Definite Integrals, Properties of definite integrals.
3) To understand methods of integrations: Integration by parts, by Tabular, by Partial Fractions.
4) Study the applications of the definite integral: 1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate.
5) To understand the Numerical methods for evaluating definite integrals: I- Trapezoidal rule, II- Simpson's rule.
6) Study the Sequences: convergent sequence: Limits that arise frequently.
7) Study the infinite series: converges series, diverges series, Kind of series: 1-Geometric Series, P-Series.
8) To knows the Tests for converges of series:1-Integral Test, 2-Ratio Test, 3-RootTest, Taylor and Maclaurin series.

Module Learning Outcomes
مخرجات التعلم للمادة الدراسية

1) Describe the characteristics and Properties of definite integrals.
2) Describe and State the concept of methods of integrations: Integration by parts, by Tabular, by Partial Fractions.
3) To understands the applications of the definite integral: 1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate.
4) To knows the meaning of the Numerical methods for evaluating definite integrals: i) Trapezoidal rule, ii) Simpson's rule.
5) Describe the Sequences: convergent sequence: Limits that arise frequently.
6) Describe the Infinite series: converges series, diverges series, Kind of series: 1-Geometric Series, 2- P-Series.

	7) Describe the Unit vector, vector equation, cross product, dot product. 8) To understands the Tests for converges of series: 1-Integral Test, 2-Ratio Test, 3-RootTest, To knows the meaning of Taylor and Maclaurin series.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Integration: Definite Integrals, Properties of definite integrals, Methods of integrations: Integration by parts, by Tabular, by Partial Fractions, Integration by reduction formulas, Integrating powers, Integration by Trigonometric Substitutions, Integration of irrational function, Integration of rational function of Trigonometric, Applications of the definite integral:1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate. [20 hr] • 4-Volumes By Disks: i) around $x-axis$, ii) around $y-axis$, 5- Volumes By Washers: i) around $x-axis$, ii) around $y-axis$, 6- Volumes By Cylindrical Shells: i) about $x-axis$, ii) about $y-axis$, Volume in polar co-ordinates system, Length of a plane curve, Area of a surface of revolution, Area of the surface in polar co-ordinates system. [20 hr] • Area of a surface of revolution, Area of the surface in polar co-ordinates system, Multiple Integrals: Double Integrals, Triple Integrals, Numerical methods for evaluating definite integrals: i) Trapezoidal rule, ii) Simpson's rule, Sequences: convergent sequence: Limits that arise frequently, Infinite series: converges series, diverges series, Kind of series:1-Geometric Series, P-Series, Tests for converges of series:1-Integral Test, 2-Ratio Test, 3-RootTest, Taylor and Maclaurin series. [20 hr]

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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7,#8
	Projects				
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Integration: Definite Integrals, Properties of definite integrals.
Week 2	Methods of integrations.
Week 3	Methods of integrations.
Week 4	Methods of integrations.
Week 5	Applications of the definite integral.
Week 6	Volumes By Disks.
Week 7	Volumes By Washers. (mid-term Exam)
Week 8	Volumes By Cylindrical Shells.
Week 9	Volume in polar co-ordinates system, Length of a plane curve.
Week 10	Area of a surface of revolution, and in polar co-ordinates system.
Week 11	Multiple Integrals.
Week 12	Numerical methods for evaluating definite integrals.
Week 13	Sequences.
Week 14	Infinite series.
Week 15	Taylor and Maclaurin series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr, Weir Joel R. Hass 'Calculus' (V.12), 2014**.**	Yes
Recommended Texts	1. Haward Anton" Calculus and analytic geometry". 2. Schoms series "Theory and problems of calculus" .	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

Module Information
معلومات المادة الدراسية

Module Title	Manufacturing Processes & Engineering Workshop	Module Delivery
Module Type	S	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	ERE1203	
ECTS Credits	4	
SWL (hr/sem)	100	

Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ahmed Saad Jasim	**e-mail**	ahmed.saad.jas@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Lecture	**Module Leader's Qualification**	MSC
Module Tutor	None	**e-mail**	E-mail
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

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

Module Objectives أهداف المادة الدراسية	1) To study the machining operations and machine tools that include: turning and related operations, drilling and related operations, milling, grinding and other abrasive processes, and other machining operations. 2) To understand the bulk deformation processes in metal working that include: rolling and related operations, forging and related operations, extrusion, and wire and bar drawing and also study the sheet metal working / cutting operations, bending operations, and drawing. 3) Study the joining and assembly processes that include: fundamentals of welding, arc welding, resistance welding, oxyfuel gas welding, soldering, and brazing. 4) To learn the fundamentals of metal casting, and metal casting processes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.** Describe turning and related operations **2.** Learn drilling and related operations **3.** Give information about milling **4.** Define grinding and other abrasive processes **5.** Give information about other machining operations: shaping and planning, broaching, and sawing **6.** Know the rolling and related operations **7.** Learn about of forging and related operations **8.** Give information about extrusion **9.** Study wire and bar drawing

	10. Give information about sheet metal working / cutting operations, bending operations, and drawing **11.** Define fundamentals of welding **12.** Know the arc welding **13.** Define resistance welding, and ox fuel gas welding **14.** Study soldering, and brazing **15.** Give information about fundamentals of metal casting, metal casting processes.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Study the machining operations and machine tools that include: turning and related operations, drilling and related operations, milling, grinding and other abrasive processes, and other machining operations. [20 hr]. • Study the bulk deformation processes in metal working that include: rolling and related operations, forging and related operations, extrusion, and wire and bar drawing and also study the sheet metal working / (1) cutting operations, (2) bending operations, (3) drawing. [20 hr] • Study the joining and assembly processes that include: fundamentals of welding, arc welding, resistance welding, oxyfuel gas welding, soldering, and brazing. [16 hr] • study the fundamentals of metal casting, and metal casting processes. [4 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success. After considering students' needs, learning styles.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	5, 10, and14	LO #1- #4, #5 - #9 and #10 - #13
	Assignments	2	10% (10)	6 and 11	LO #1 - #5 and #6 - #10
	Report	1	5% (5)	13	All
	Practical	1	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	11	LO #1 - #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Turning and Related Operations
Week 2	Drilling and Related Operations
Week 3	Milling
Week 4	Grinding and Other Abrasive Processes
Week 5	Other Machining Operations : (1) shaping and planning, (2) broaching, and (3) sawing
Week 6	Rolling and Related Operations
Week 7	Forging and Related Operations
Week 8	Extrusion, Wire and Bar Drawing
Week 9	Wire and Bar Drawing
Week 10	Sheet Metal Working / (1) Cutting Operations, (2) Bending Operations, (3) Drawing
Week 11	Fundamentals of Welding – (mid-term Exam)
Week 12	Arc welding
Week 13	Resistance welding, Oxyfuel gas welding
Week 14	Soldering, Brazing
Week 15	Fundamentals of Metal Casting, Metal Casting Processes
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	A) The turning workshop consists of training its students on: 1) Listed work (adjusting the correct measurements for different diameters and lengths using a triangle turning pen).
Week 2	2) Make the arches (it should be on the same piece as the first exercise, after adjusting it and making sure of the measurements according to the drawing in the first exercise).
Week 3	3) Making different angles (introducing the student to the use of shaping pens (square pen, corner pen 55)).
Week 4	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 5	B) The filling workshop consists of training its students on: 1) Filling flat surfaces and filling straight and inclined angles
Week 6	2) Sawing and sawing process
Week 7	3) Hand Drills and Vertical Stationary Drills (How to Operate and Use)
Week 8	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 9	C) The welding workshop consists of training its students on various welding methods, such as: 1) Manual arc welding: a) Training on how the electric arc works and occurs between two electrodes.
Week 10	b) Training on how to make welding lines straight.
Week 11	c) Training on how to weld the construction exercise (increasing the thickness of the piece).
Week 12	2) Gas welding (oxy-acetylene)
Week 13	3) Electric arc welding protected by inert gas represented by gases such as argon and carbon dioxide, where argon gas is used with tungsten electrode welding machines (T.I.G) and CO2 gas with machines (M.I.G).
Week 14	4) Electrical resistance welding, specifically spot welding.
Week 15	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 16	**Preparatory week before the final Exam**

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

Required Texts	[1] Groover, Mikell P. ***Fundamentals of modern manufacturing: materials, processes, and systems***. John Wiley & Sons, 2020.	No
Recommended Texts	None	No
Websites	[1]https://books.google.com/books?hl=ar&lr=&id=mB7zDwAAQBAJ&oi=fnd&pg=PA1&dq=FUNDAMENTALS+OF+MODERN+MANUFACTURING+Materials,Processes,andSystems+Fourth+Edition&ots=H1hck34oBY&sig=os2Xrjr-16zwPs6JVbGDcG4fuy8	

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
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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.

Module Information
معلومات المادة الدراسية

Module Title	**Chemistry**		**Module Delivery**	
Module Type	**S**		☒ **Theory**	
Module Code	**ERE1204**		☐ **Lecture**	
ECTS Credits	**4**		☒ **Lab**	
SWL (hr/sem)	**100**		☐ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	Two	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Ali Jassim Al-Zuhairi	**e-mail**	met.ali.jassim@uobabylon.edu.iq	

Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) To develop problem solving skills and understanding of the quantitative analytical methods. 2) To understand acids, basis and salts. 3) This course deals with the basic concept of buffers. 4) This is the basic subject for all physical chemistry concepts. 5) To understand ideal gas law. 6) To perform the thermochemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	10. The students will know the principle of analytical chemistry. 11. List the quantitative and qualitative analysis. 12. Summarize what is meant by acids, basis and salts. 13. Discuss the titration curves. 14. Describe the principle of organic chemistry in terms of alkan, alkenes and alkynes. 15. Identify the basic hydrocarbons by its nomenclature and reactions. 16. Explain the Ideal gas law. 17. Identify the enthalpy of a chemical reaction.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction of Analytical Chemistry and its types, The principle of Volumetric analysis, Moler, Normal and formal concentration, Acid Base titrations, Buffers and Titration Curves, Oxidation-Reduction reactions, Precipitation reactions. [20 hrs] • Organic chemistry (Introduction), The Alkanes, Alkanes reactions and Alkenes. [15 hrs] • Alkenes reactions, Alkynes and Alkynes reactions. [15 hrs] • Ideal gas low, Boyle's law, Charles's law, thermochemistry, Energy sources. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	٦٤	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٣٦	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Analytical Chemistry and its types
Week 2	The principle of Volumetric analysis
Week 3	Moler, Normal and formal concentration
Week 4	Acid Base titrations
Week 5	Buffers
Week 6	Review of Titration Curves
Week 7	Mid-term Exam
Week 8	Oxidation-Reduction reactions
Week 9	Alkanes reactions
Week 10	Alkenes reactions
Week 11	Alkynes reactions
Week 12	Aldehydes and aketons
Week 13	Carboxylic acids reactions
Week 14	Ideal gas low and Boyle's law
Week 15	Thermochemistry and Energy sources
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Acid- Base titration
Week 2	Lab 2: Reduction - Oxidation titration
Week 3	Lab 3: Precipitation titration
Week 4	Lab 4: Complex metric titration
Week 5	Lab 5: Determination the density of a liquid
Week 6	Lab 6: Determination of Calorimetric Constant
Week 7	Lab 7: Determination the Viscosity of a pure liquid

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	General Chemistry ;Darrell D. Ebbing; Steven D. Gammon	no
Recommended Texts		
Websites	https://books.google.iq/books?id=BnccCgAAQBAJ&printsec=frontcover&redir_esc=y#v=onepage&q&f=false	

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 Information معلومات المادة الدراسية				
Module Title	**English language I**		**Module Delivery**	
Module Type	**B**		☒ **Theory**	
Module Code	**UOBABb1101**		☐ **Lecture**	
ECTS Credits	٤		☐ **Lab**	
SWL (hr/sem)	١٠٠		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	Two	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	

Module Leader	Rusul Dawood Salman	**e-mail**	met.rusul.dawood@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MSc
Module Tutor	-	**e-mail**	-
Peer Reviewer Name	-	**e-mail**	-
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) Developing skills of reading, writing, speaking and listening. 2) Providing a survey of theoretical perspectives concerning the student's learning and development. 3) Providing an overview of a variety of important issues in English language that help the students to communicate easily with others. 4) Applying the theoretical issues in order to give the student the opportunity to practice language and encourage him to speak with foreign people. 5) Giving the students the ability to express their opinions and participating in discussion. 6) Using variety of digital devices and tools in order to interpret and create meaning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The ability to understand the uses of language in the light of purposes. 2. Identifying the most important daily phrases to be applicable in life. 3. Development of evidence-based arguments. 4. Making the students aware of the correct usages of English grammar in writing and speaking. 5. Improving the students' ability in English in terms of fluency and comprehensibility. 6. Students will give oral presentation and receive feedback on their performance. 7. Improving the students' reading skills through the extensive reading. 8. Providing the students with a large repertoire of vocabulary. 9. Applying the grammatical forms in communicative contexts such as: class activities, reading & writing, and homework. 10. Strengthening the students' ability to write essays and academic papers. 11. Enhancing the students' competence in four important elements: Writing. speaking, reading and listening.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Focusing on four important issues in English language: Writing, speaking reading and listening [15 hrs] • Understanding the general topic or main idea, major points, important facts and details, vocabulary in context, and pronoun references. [15 hrs] • Comprehending the main idea, major points, and important details related to the main idea. [10 hrs] • Students should be able to speak successfully in and outside the classroom. [15 hrs] • [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals • Recognizing tenses choosing the correct form, arranging the sentences in the correct order, [15 hrs] • Covering aspects such as phonetics, semantics and pragmatics. [7 hrs]

	• Exploring the building blocks of the language, understanding language in deeper level, learning how to structure words and sentences so that other people can understand them. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Student is an essential part of the process thus we should take into consideration the levels of student's' comprehension whence providing him with better and easies planning, improved ability to monitor student's goals ,teaching language skills across all curriculum topics, Speaking slowly and allowing extra time for students to respond, using a variety of methods to engage learning,.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٣٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٦٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٤
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٠٠		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	20% (20)	5 and 13	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – Giving a general information about English Language
Week 2	Speaking (paired choice) asking about the general opinions about possible issues
Week 3	Speaking(campus announcement & general conversation) report on the speaker's opinion & explain why he/she feels that way
Week 4	Integrated speaking (Academic reading & Lecture) explaining the academic topics & describing the main points in it.
Week 5	Listening to engineering conversation to obtain a wide vocabularies
Week 6	Listening to various videos concerning the engineering fields as: (Mechanical engineering, electrical engineering in addition to renewable energies).
Week 7	**Mid-term Exam**
Week 8	Writing (learning students how to write essays on engineering field)
Week 9	Writing (enabling students to write their opinion about specific academic topic in general or write about engineering subject in particular).
Week 10	Speaking (making the students sum up the main points of the lecture that is delivered previously)
Week 11	Speaking (increasing the student' ability to speak fluency and increasing its rate)
Week 12	Listening (encourage the student to make inferences from what he/she heard before)
Week 13	Listening (ask the student what the speaker imply in his/her speech)

Week 14	Writing (ask student to write the essential information in the highlighted sentences in paragraph and make paraphrasing in to those sentences)
Week 15	Witting (encourage student to extract the most important issues in paragraph)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	TOEFL Practice Online The official practice test that can help you go anywhere	No
Recommended Texts	The Cambridge Encyclopedia of the English Language By David Crystal	No
Websites	https://www.cambridge.org./	

Grading Scheme
مخطط الدرجات

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

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

Module Information
معلومات المادة الدراسية

Module Title	**Human Rights and democracy**	**Module Delivery**
Module Type	**B**	☒ **Theory**
Module Code	**UOBAB1104**	☐ **Lecture**
ECTS Credits	**2**	☐ **Tutorial**
SWL (hr/sem)	**50**	☐ **Practical**

				☐ **Seminar**	
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Abd Alkhaliq Mahdi		**e-mail**	abdkhaliqmahdi@uobabylon.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date		01/09/2024	**Version Number**		2.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-زيادة معرفة الطالب بالجانب المفاهيمي النظري والتطور التاريخي لمادة حقوق الانسان والديمقراطية 2-تنمية مهارات الطالب التحليلية والنقدية فيما يتعلق بواقع ومستقبل حقوق الانسان والديمقراطية 3-تدريب الطالب على اهمية المشاركة الفاعلة في جوانب الحياة العامة كتعزيز احترام مبادى حقوق الانسان العامة والمشاركة الفاعلة في الحياة السياسية والثقافية. 4-تمكين الطلاب من فهم اهمية التعليم ودوره في نشر ثقافة حقوق الإنسان والديمقرلطية في بناء مجتمع حضاري يقوم على أساس الحكم الصالح الذي من اهم مقوماته الإيمان بحقوق الإنسان والتربية عليها والمشاركة الفاعلة في الحكم عبر الانتخابات الحرة والعادلة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١.يتعلم الطالب خلال السنه الدراسية قوانين ومبادئ حقوق الانسان. ٢.اعداد جيل واع بموضوع حقوق الانسان. ٣.ترسيخ مفهوم الحقوق والديمقراطية عند الطلبة وأشاعتها في المجتمع ٤.مواكبة الطالب على تجارب الامم والاطلاع على اهم القرارات والمواثيق والصكوك الدولية في مجال حقوق الانسان والديمقراطية.
Indicative Contents المحتويات الإرشادية	تكمن اهمية مادة حقوق الانسان والديمقراطية من خلال دراسة الطالب لاهم الحقوق التي جاءت في الاعراف والقوانين الدولية فضلا عما جاء في الشريعة الاسلامية والدساتير العراقية لا سيما الدستور النافذ لسنة ٢٠٠٥ فضلاً عن معرفة الطالب للمواثيق الدولية التي صدرت بخصوص حقوق الانسان , هذا من جهة ومن جهة اخرى اطلاع الطالب على التجارب الديمقراطية التي سبقتنا للاستفادة منها .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١) مناقشة يومية لمعرفة مدى استيعاب الطلبة للمادة ووضع تقييم للمشاركات اليومية. ٢) امتحانات يومية باسئلة علمية متنوعة وقصيرة لفهم مدى استيعابهم للمادة. ٣) اعطاء جزء من درجة كل فصل للواجبات البيتية. ٤) امتحانات يومية (كوزات) و امتحانات شهرية للمنهج الدراسي والامتحان النهائي.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	19	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects				
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	2hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	مفهوم حقوق الانسان وخصائصها ومميزاتها
Week 2	حقوق الانسان في التاريخ القديم
Week 3	الشخصية القانونية تعريفها ومميزاتها
Week 4	موقف الشرائع السماوية والحضارات الغربية من حقوق الانسا ن
Week 5	مصادر حقوق الانسان المصادر الدولية لحقوق الانسان- –
Week 6	المصادر الوطنية لحقوق الانسان
Week 7	ضمانات حقوق الانسان الضمانات الدولية والإقليمية- – امتحان نصف الفصل
Week 8	الضمانات الوطنية ضمانات حقوق الانسان في الإسلام- –
Week 9	التطور التاريخي لحقوق الأطفال وحق الأطفال في الاتفاقات الدولية
Week 10	الديمق ا رطية مفهومها والتطور التاريخي للديمقراطية
Week 11	اركان الديمقراطية
Week 12	الانتخابات الديمقراطية
Week 13	أنواع نظمة الحكم الديمقراطية
Week 14	مبدأ سيادة القانون ومبدأ الفصل بين السلطات
Week 15	أثر الاعلام والعولمة في مجال حقوق الانسان
Week 16	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	د. حميد حنون خالد ، حقوق الانسان	Yes
Recommended Texts	د. فخري رشيد المهنة ود. صلاح ياسين داود ، المنظمات الدولية ، جامعة الموصل.	No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition

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

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

المرحلة الثانية /٢٠٢٥

Module Information معلومات المادة الدراسية					
Module Title	**Thermodynamics I**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2311**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	١٥٠			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level		UGII	**Semester of Delivery**		Three
Administering Department		Energy Engineering	**College**		College of Engineering\Al-Musayab
Module Leader	Ali Jaber Abdulhamed		**e-mail**		msb.ali.jaber@uobabylon.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/09/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) To develop problem solving skills and understanding of pure substance. 2) To understand behavior of Ideal gases. 3) To develop problem solving skills and understanding of IC engine cycles. 4) To develop problem solving skills and understanding of heat, work and the relation between it. 5) To develop problem solving skills and understanding of 1st law of thermodynamics. 6) To develop problem solving skills and understanding of 1st law on closed system. 7) To develop problem solving skills and understanding of 1st law on open system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know how to use the thermodynamic tables. 2. Recognize how pure substance works in system. 3. Recognize between pure substance and ideal gases. 4. Recognize between air standard Otto, Diesel, and Dual cycles. 5. Know the relations between heat and work. 6. Know the energies as Kinetic, potential, enthalpy and internal energy. 7. Know the 1st law of thermodynamics. 8. Recognize between open and close systems.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction, Definition, Force, pressure, Energy, resources, Heat, work, power, Internal energy, enthalpy, 0th law, Temperature, and its measurement, thermodynamics properties, liquid-vapor relations. **[20 hrs]** • Ideal gases, efficiency analysis for IC engines. **[15 hrs]** • First law of thermodynamics/perpetual motion machine; Equation of state, closed-system processes, constant volume pressure and processes, open -system processes. **[20 hrs]** • Adiabatic and polytrophic processes; Open -system processes, steady- flow energy equation. **[20 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	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	5
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**
	Quizzes	2	10% (20)	5 and 10	LO #1 - #7

Formative assessment	**Projects / Lab.**	1	10% (10)	Continuous	All
	Report	1	10% (10)	11	LO #3, #5 and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #4
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Some Concept and Definitions
Week 2	Properties of Pure Substances
Week 3	Thermodynamics Tables
Week 4	Ideal Gases
Week 5	Air-standard Otto Cycle
Week 6	Air-standard Diesel Cycle
Week 7	The Work Type (W)
Week 8	Thermodynamic work
Week 9	Mid-term Exam
Week 10	Heat Transfer in Control mass system
Week 11	The 1st Law of Thermodynamic - Heat Transfer, enthalpy, and internal Energy
Week 12	Close system processes
Week 13	Open system processes
Week 14	The 1st Law of Thermodynamic in Turbine, Compressor, Boiler, Condenser
Week 15	The 1st Law of Thermodynamic in, pipe, Duct, valves, Mixing Chamber
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Calculate the dryness fraction for wet steam
Week 2	Lab 2: Find the pressure curve for steam
Week 3	Lab 3: Verification of Boyle's law.
Week 4	Lab 4: Verification of Charles's law
Week 5	Lab Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamental of Classical Thermodynamics / Van Wylen	Yes
Recommended Texts	Thermodynamics: an Engineering Approach / Yunus Cengel	Yes
Websites	https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Thermodynamics%3A+an+Engineering+Approach&btnG=	

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 Information
معلومات المادة الدراسية

Module Title	**Fluid Mechanics I**		**Module Delivery**	
Module Type	**S**		☒ **Theory**	
Module Code	**ERE2312**		☐ **Lecture**	
ECTS Credits	**6**		☒ **Lab**	
SWL (hr/sem)	**150**		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Three	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Sanaa Abdulrazaq Jassim	**e-mail**	met.sanaa.abd@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	PHD	
Module Tutor		**e-mail**		
Peer Reviewer Name	None	**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0	

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) To study the fluid mechanics science. and why study fluid mechanics. and to understand fluid properties. 2) To learn fluid properties. 3) Study the fluid in static condition, pressure of fluid, pressure units and gages. 4) Study the forces acting on bodies immersing and floating in fluids, stability and relative equilibrium of them. 5) To understand testing of fluids, viscosity, type of pressure gauges, hydrostatic pressure measurement, stability of body floating in liquid, proving Bernoulli's equation. 6) To learn fluid in dynamic equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To understand Fluid properties, Newton's law of Viscosity, Kinematic viscosity Bulk Modulus of elasticity, and Surface tension. Describe basic definition and conception of Fluid Statics, Pressure at a point, - Variation of Pressure in a static fluid. 2. Approve Hydrostatic laws, and learn about units and scales of Pressure measurement, and types of Manometers. 3. Calculate Force on plane and curved surfaces. 4. Define buoyant force, and describe Stability of floating and submerged bodies. 5. Understand relative equilibrium (linear acceleration), and relative equilibrium (uniform rotation) 6. Define Fluid flow concepts and Basic Equations. 7. Continuity equation. 8. Euler's equation of motion along streamline. 9. Bernoulli equation. 10. With regard to the practical side, the program aims to familiarize students with experiments related to viscosity measurement and identification of pressure measuring devices in addition to measuring hydrostatic pressure and equilibrium of floating and submerged bodies in fluids.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction of fluid mechanic science, and why study fluid mechanics, and to understand fluid properties. Also to learn static fluid mechanics. [15 hrs]. • Study the Pressure at a point,- Variation of Pressure in a static fluid . Hydrostatic laws, units and scales of Pressure measurement, and types of Manometers. [15 hrs] • Calculate Force on plane and curved surfaces. Buoyant force, and Stability of floating and submerged bodies .Understand relative equilibrium (linear acceleration), and relative equilibrium (uniform rotation). [25 hrs]. • Define Fluid flow concepts and Basic Equations. Continuity equation. Euler's equation of motion along streamline. Bernoulli equation. [20 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	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)	**150**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #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%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fluid properties , General definitions, - Newton's law of Viscosity, - Kinematic viscosity
Week 2	Bulk Modulus of elasticity, Surface tension
Week 3	Fluid Statics, Definitions, Pressure at a point, - Variation of Pressure in a static fluid
Week 4	Hydrostatic laws, Units and scales of Pressure measurement
Week 5	Manometers (Pressure Measurement)
Week 6	Force on plane surfaces
Week 7	Force on curved surfaces – (Mid-term Exam)
Week 8	Buoyant force
Week 9	Stability of floating and submerged bodies
Week 10	Relative equilibrium (linear acceleration)
Week 11	Relative equilibrium (uniform rotation)
Week 12	Fluid flow concepts and Basic Equations, Definitions
Week 13	Continuity equation
Week 14	Euler's equation of motion along streamline
Week 15	Bernoulli equation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	None
Week 2	Experiment 1: Measurement of viscosity
Weeks 3-4	None
Week 5	Experiment 2: identifying pressure gauges and manometers
Week 6	Experiment 3: Hydrostatic pressure
Weeks 7-9	None
Week 10	Experiment 4: Metacentric height

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Frank M. White, Fluid Mechanic, fifth edt.,	Yes
Recommended Texts	1- ATextbook of Fluid Mechanics And Hydraulic Machines. Ninth edt. 2010 2- FLUID MECHANICS FOR ENGINEERS , 2011	No
Websites	https://www.infobooks.org/free-pdf-books/engineering/fluid-mechanics/ https://www.academia.edu/20207960/Fluid_Mechanics_Textbook	

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 Information
معلومات المادة الدراسية

Module Title	**Engineering Mathematics**		**Module Delivery**	
Module Type	**S**		☒ **Theory**	
Module Code	**ERE2313**		☐ **Lecture**	
ECTS Credits	**6**		☐ **Lab**	
SWL (hr/sem)	**150**		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Three	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Mohammed Ali Mohammed	**e-mail**	msb.mohammed.ali@uobabylon.edu.iq	

Module Leader's Acad. Title	Assist. Lecture	**Module Leader's Qualification**	MSC
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics	**Semester**	1
Co-requisites module	Applied Mathematics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding the basic concepts of calculus, differential equations, and linear algebra. 2. Applying mathematical principles to solve engineering problems. 3. Developing skills in mathematical modeling and simulation. 4. Understanding the role of mathematics in engineering design and analysis. 5. Developing critical thinking and problem-solving skills. 6. Developing effective communication skills in mathematics. 7. Understanding the importance of mathematical accuracy and precision in engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the concept of vectors and their representation in two and three dimensions. 2. Being able to perform vector operations such as addition, subtraction, scalar multiplication, dot product, and cross product. 3. Understanding the concept of periodic functions and their representation using Fourier series. 4. Learning the techniques to calculate Fourier coefficients and Fourier series. 5. Applying Fourier series to solve problems in signal processing, heat transfer, and wave propagation. 6. Understanding the concept of Fourier transform and its applications. 7. Understanding the properties of Fourier transform, such as linearity, time shifting, and frequency shifting 8. Understand the basic concepts and terminology of differential equations. 9. Solve first-order differential equations using various techniques such as separation of variables, integrating factors, and exact equations. 10. Solve second-order differential equations with constant coefficients using various techniques such as characteristic equations and undetermined coefficients. 11. Solve higher-order differential equations and systems of differential equations. 12. Understanding the concept of Laplace transform and its application in solving differential equations. 13. Ability to transform time-domain signals into frequency-domain signals using Laplace transform. 14. Understanding the properties of Laplace transform, such as linearity, time shifting, differentiation, integration, convolution, and initial and final value theorems. 15. Understanding the concepts of sequences and series, including arithmetic and geometric sequences, and the sum of a finite and infinite series. 16. Solving problems involving sequences and series, such as finding the nth term, the sum of the first n terms, and the limit of a sequence.
Indicative Contents	**Indicative content includes the following**. • Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations. Equations of lines and planes, product of

المحتويات الإرشادية	three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector. [8 hrs] • **Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering. **Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications. [16 hrs] • **Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point. **Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations. [20 hrs] • **Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.[12 hrs] • **Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	3 and 12	LO #3, #4 and #6, #7
	Projects	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%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations.

Week 2	**Vector Analysis**: Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector**.**
Week3& 4	**Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering.
Week 5&6	**Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications.
Week 7&8	**Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point.
Week 9 & 10& 11	**Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations
Week 12 &13&14	**Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.
Week 15	**Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	***Advanced Engineering Mathematics (Muhadharaty)***	No
Recommended Texts	Engineering-mathematics-ii-2009-cuppy	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

Module Information معلومات المادة الدراسية					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2304**			☒ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Bashar Abid Hamza	**e-mail**	met.basher.abid@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor		**e-mail**	E-mail		
Peer Reviewer Name	Name	**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics (Statics)	**Semester**	Two
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Introducing the concept of strength of materials. 2. learning the principles of stress and the associated strain 3. Studying the different types of deformations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. reviewing some of the important principles of statics 2. introducing the concepts of normal and shear stress and the associated strain 3. discussing the relation between stress and strain for materials that are commonly used in engineering 4. learning how to determine deformation of members subjected to axial loading with and without change in temperature 5. discussing the stress and deformation of shafts or tubes that are subjected to torsion 6. establishing the shear and moment diagrams in beam under bending then computing the stresses and the associated deformation 7. reviewing and combining stresses learned previously and finding the state of stress 8. showing how to transfer the state of stress into coordinate associated with different orientation 9. computing the deformation (deflection and slope) of beams
Indicative Contents المحتويات الإرشادية	Part 1: structured SWL • Simple Stress: normal stress, shear stress, shear stress equilibrium, bearing stress, allowable stresses (12 h)

	• stress strain relations : normal strain, shear strain, , normal stress strain diagram, hooks law, Poisson ratio, shear stress strain diagram (6 h) • Axial loading: deformation of axial members, statically indeterminate axial loaded members, thermal stresses. (6 h) • Torsion: shear stress in circular shafts, angle of twist, statically indeterminate torque loaded members. (6 h) • Shear and moment diagrams: equation method of establishing shear force and bending moment diagrams for beams, graphical method of constructing shear and moment diagrams (12 h) • Stresses in beams: bending stress, transvers shear stress (12 h) • combined loading: thin walled vessels, cylindrical vessels, spherical vessels, combined loading in members (12 h) • Stress transformation: equation method of stress transformation, Mohr's circle (12 h) • Deflection in beams: integration method, moment area method (12 h) Part 2: unstructured SWL • problem solving assignments: 10 assignment each contains 3 types of problems (fundamental problems, actual problem, conceptual problems) (38 h) • project problem: selecting, investigating , analysis, and reporting a problem related stress and strain analysis of engineering materials (18 h including 3 h seminar)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to deliver this module is by encouraging the students to actively participate in solving homework, prepare and take quizzes, and attend discussion groups. This strategy, besides understanding the material, will enhance the student critical thinking.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**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 12	1,2,3 and 5,6
	Assignments	10	10% (10)	2,3,4,6,7, 10,11,13,14,15	1 through 9
	Laboratory	5	10% (10)	Continuous	1 through 9
	Projects /Report	1	10% (10)	15	7 through 9
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	1 through 5
	Final Exam	3hr	50% (50)	16	1 through 9
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, normal stress

Week 2	Shear stress, bearing stress, allowable stress
Week 3	Strain, stress strain relations
Week 4	Axial loading, thermal stress
Week 5	Torsion, angle of twist
Week 6	Shear force and bending moment diagrams
Week 7	Bending stress in beams
Week 8	Midterm Exam
Week 9	Shear stress in beams
Week 10	Thin walled vessels
Week 11	Combined loading
Week 12	Stress transformation 1
Week 13	Stress transformation 2
Week 14	Deflections in beams 1
Week 15	Deflections in beams 2
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: tension test
Week 2	Lab 2: compression test
Week 3	Lab 3: stress strain relation
Week 4	Lab 4: single vs. double shear
Week 5	Lab 5: torsion test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Mechanics of Materials By R. C. Hibbeler	Yes
Recommended Texts	Strength of Materials By Pytel and Singer	No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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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 Information معلومات المادة الدراسية					
Module Title	**Material Science**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ERE2305**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGII		**Semester of Delivery**	Three	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Maithem Hussein Rasheed		**e-mail**	met.maithem.hussiem@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist .Professor		**Module Leader's Qualification**	M.SC	
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) To study the engineering materials science, and why study engineering materials, and to understand classifications of Engineering Materials. 2) To learn crystal and no crystal structures and unit cell. 3) Study the direction of crystallography and miller indices. 4) Study the atomic packing factors. , study the stress – strain curve , young 5) To understand testing of engineering materials, tension, compression, types of hardness methods. 6) to learn metallurgy engineering, phase equilibrium diagram , Fe- C diagram , heat treatments composite materials

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain importance of materials in materials science and engineering field. 2. Relate between material and engineering. 3. Classify materials according to their types. 4. Describe basic definition and conception of materials and physical properties of materials. 5. Follow new developments in materials application field. 6. Information about atomic structure, atomic bonds, crystal structure, crystal geometry and crystal defects. 7. Define structure of atoms.. 8. Define space lattice, unit cell, crystal systems and Bravais lattice. 9. Calculate unit cells and volumetric, planar and linear density values in unit cell.. 10. Describe crystal imperfections. 11. Give information about mechanical properties of materials. 12. Stress- strain curve. 13. Study the different hardness methods experiments and calculations. 14. Give information about metal, polymer, ceramic and composite materials and their properties which used in automobile industry. 15. Study the metallurgy engineering, phase equilibrium diagram, Fe- C diagram, heat treatments.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction of engineering materials science, and why study engineering materials, and to understand classifications of Engineering Materials. Also to learn crystal and no crystal structures and unit cell, and study the direction of crystallography and miller indices. Study the atomic packing factors. [15 hr.] • study the stress – strain curve , young modulus .and to understand testing of engineering materials , tension , compression , types of hardness methods (brinell , Vickers , Rockwell). Average and standard deviation. [15 hr.] • Study the composite materials (matrix and reinforcement) , ceramics materials, metal, polymer, ceramic and composite materials and their properties which used in automobile industry . • Study the metallurgy engineering, phase equilibrium diagram, Fe- C diagram, heat treatments. [15 hr.]

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 اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	2	10% (15)	5 and 10	LO #1, #2 and #10

Formative assessment	**Assignments**	2	10% (15)	2 and 10	LO #3, #4 and #6, #10
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #14
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of material science
Week 2	Classifications of engineering material
Week 3	Crystal and non-crystal structures
Week 4	Unit cell and atomic packing factor
Week 5	Direction of crystallography and millier indices
Week 6	Stress – strain curve , young modulus
Week 7	Mechanical properties of engineering material. (Mid-term Exam)
Week 8	Tension – compression tests.
Week 9	Hardness test , types of hardness methods.
Week 10	Composite materials
Week 11	Ceramic materials
Week 12	Non-destructive tests
Week 13	Metallurgy ,metals and alloys
Week 14	phase equilibrium diagram , Fe-C phase diagram
Week 15	Heat treatments
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Materials Science and Engineering ,william callister, 2007	Yes
Recommended Texts	The science and engineering of materials, donald askeland 2005.	No
Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf	

Grading Scheme
مخطط الدرجات

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

Module Information
معلومات المادة الدراسية

Module Title	**English language II**	**Module Delivery**
Module Type	**B**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**UOBAB2302**	
ECTS Credits	٤	
SWL (hr/sem)	١٠٠	

Module Level	UGII	**Semester of Delivery**	Three
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Rusul Dawood Salman	**e-mail**	met.rusul.dawood@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.A.
Module Tutor	-	**e-mail**	-
Peer Reviewer Name	-	**e-mail**	-
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

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

Module Objectives أهداف المادة الدراسية	1) Improving reading, writing, speaking, and listening abilities. 2) Presenting an overview of theoretical perspectives concerning the students' development and learning. 3) Giving the students a broad understanding of various crucial English language topics that facilitate easy communication with others. 4) Applying the theories into reality to allow the student to practice speaking with foreigners and to encourage him to do so. 5) Allowing students to participate in discussions and sharing their views. 6) Using a range of digital tools and devices to interpret and construct meaning.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-understanding how language is used in relation to its objectives. 2. Selecting the most essential everyday expressions that can be used in daily interactions. 3. Developing the arguments based upon realities. 4. Teaching the students how to use English grammar properly in speaking and writing. 5. Increasing the students' proficiency and comprehension of the English language. 6. Students will do an oral presentation and get comments on how they did. 7. Increasing the students' reading proficiency through in-depth reading. 8. Giving the students access to a wide variety of words. 9. Using the grammatical forms in communicative contexts including homework, reading, and writing assignments. 10. Improving students ' abilities to write essay and academic paper in a skillful way. 11. Improving students' proficiency in four
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Emphasizing the following four crucial English-language issues: speaking, reading, and listening; and [15 hrs] • comprehending the overall subject or main idea, major concepts, essential details, terminology used in context, and pronoun references. [15 hrs] • being able to understand the primary idea, important components, as well as essential information relevant to the main idea. [10 hrs] • Inside as well as outside of the classroom, students should be able to talk clearly. [15 hrs] <u>Part B - Analogue Electronics</u> Fundamentals • Learning tenses selecting the appropriate format, placing the sentences in the appropriate order, [15 hrs] • Covering aspects such as phonetics, semantics and pragmatics. [7 hrs] • Examining the language's grammatical foundations, developing a deeper knowledge of language, and learning how to organize words and sentences so that other people can understand them. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The student is a crucial component of the learning process, so we should consider his comprehension levels as the main concern by providing him with better and easier planning, improved ability to track student goals, teaching language skills across all curriculum topics, speaking slowly and giving students extra time to respond, and using a variety of methods to engage learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٣٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٦٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٤

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٠٠

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	20% (20)	5 and 13	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – Giving a general information about English Language
Week 2	Speaking in classroom the student respond to questions & participate in academic discussions with other students
Week 3	Speaking the student must synthesize and summarize what they have read in their textbooks and heard in class
Week 4	Speaking (outside classroom) participate in casual conversations& express their opinions
Week 5	Listening understand the relationships between ideas presented (for example, compare/contrast, cause/effect, or steps in a process)
Week 6	Listening to various videos concerning the engineering fields as: (Mechanical engineering , electrical engineering in addition to renewable energies).
Week 7	**Mid-term Exam**
Week 8	Reading each word and each sentence, practice skimming a passage quickly to get a general impression of the main idea.
Week 9	Reading (Choose some unfamiliar words in the passage and guess the meanings from the context (surrounding sentences).
Week 10	Speaking (communicate with people in such places as the bookstore, the library, and the housing office)
Week 11	Speaking (increasing the student' ability to speak fluency and increasing its rate)
Week 12	Listening for pragmatic understanding (recognize a speaker's attitude and degree of certainty)
Week 13	Listening make connections among pieces of information in a conversation or lecture
Week 14	Writing (Often students need to write a paper or an essay response on an exam about what they are learning in their classes. This requires combining information they have heard in class lectures with what they have read in textbooks or other materials).
Week 15	Witting (take notes on what they hear and read, and use them to organize information before writing / summarize, paraphrase, and cite information from the source material accurately / write about the ways the information they heard relates to the information they read)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	TOEFL Practice Online The official practice test that can help you go anywhere	No
Recommended Texts	The Cambridge Encyclopedia of the English Language By David Crystal	No

Websites	https://www.cambridge.org./

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

Module Information معلومات المادة الدراسية					
Module Title	**Al-Ba'ath party Crimes**			**Module Delivery**	
Module Type	**A**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOBAB2301**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGII	**Semester of Delivery**		Three
Administering Department		Energy Engineering	**College**		College of Engineering\Al-Musayab
Module Leader	Abd Alkhaliq Mahdi		**e-mail**		E-mail
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Abd Alkhaliq Mahdi		**e-mail**		abdkhaliqmahdi@uobabylon.edu.iq
Peer Reviewer Name		Name	**e-mail**		E-mail
Scientific Committee Approval Date		01/09/2024	**Version Number**		2.0

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

Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	١- لمعرفة الطالب بالجرائم المرتكبة من قبل نظام البعث بحق الشعب العراقي . ٢- بيان الآثار النفسية والمعنوية التي ترتبت على تلك الجرائم . ٣- توعية الطلبة وتعريفهم بالجرائم التي ارتكبها نظام البعث بحق الشعب العراقي . ٤- معرفة واطلاع الطلبة حول مدى مخالفة تلك الجرائم المرتكبة للقوانين والأعراف الدولية .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- يتعرف الطالب على مفهوم الجرائم بشكل عام واقسامها . ٢- يفهم الطالب ويدرك ماهي الجرائم المرتكبة من قبل نظام البعث في العراق . ٣- أن يطلع الطالب على الآثار السلبية والمصائب والويلات التي خلفتها تلك الجرائم على أبناء الشعب العراقي ومدى مخالفتها للاعراف والمواثيق الدولية .
Indicative Contents المحتويات الإرشادية	تكمن أهمية دراسة مادة جرائم نظام البعث في العراق كونها دليل ارشادي وتثقيفي يتمكن الطالب من خلاله الاطلاع والفهم وأن يكون على دراية ومعرفة كاملة بكافة أنواع الجرائم المرتكبة بحق أبناء الشعب العراقي من قبل زمرة البعث الطاغية خاصة وأن الطلبة لم يعاصروا تلك الاحداث ولم تكن لهم فكرة حقيقية ومعمقة عن تلك الجرائم ومدى مخالفتها للقوانين والأعراف الدولية المعمول بها عالمياً ، وكل ذلك حتى يدرك الطالب مدى المصائب والويلات التي مرت على الشعب العراقي في عهد النظام البعثي ومدى القسوة والوحشية التي ارتكبت بحقهم من قتل وأعتقال وتعذيب وترهيب .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١- مناقشة يومية لمعرفة مدى استيعاب الطلبة للمادة ووضع تقييم للمشاركات اليومية. ٢- امتحانات يومية بأسئلة علمية متنوعة وقصيرة لفهم مدى استيعابهم للمادة. ٣- اعطاء جزء من درجة كل فصل للواجبات البيتية ٤- امتحانات يومية (كوزات) و امتحانات شهرية للمنهج الدراسي والامتحان النهائي

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	31	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	19	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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 Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1-10
	Assignments	2	10% (10)	2, 12	LO # 3-10
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5-15
	Midterm Exam	2 hrs	10% (10)	7	LO # 1-7

Summative assessment	**Final Exam**	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	مفهوم الجرائم واقسامها
Week 2	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا
Week 3	أنواع الجرائم الدولية
Week 4	القرارات الصادرة من المحكمة الجنائية العليا
Week 5	الجرائم النفسية
Week 6	الجرائم الاجتماعية
Week 7	موقف النظام البعثي من الدين
Week 8	انتهاك القوانين العراقية
Week 9	صور انتهاك حقوق الانسان وجرائم السلطة
Week 10	قرارات الانتهاكات السياسية والعسكرية لنظام البعث
Week 11	الجرائم البيئية لنظام البعث في العراق
Week 12	تدمير المدن والقرى (سياسة الأرض المحروقة)
Week 13	تجفيف الاهوار وتجريف بساتين النخيل
Week 14	احداث مقابر الإبادة الجماعية المرتكبة من النظام البعثي
Week 15	التصنيف الزمني لمقابر الإبادة الجماعية في العراق
Week 16	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	د. حميد حنون خالد ، حقوق الانسان	Yes
Recommended Texts	د. فخري رشيد المهنة ود. صلاح ياسين داود ، المنظمات الدولية ، كلية القانون ، جامعة الموصل .	No
Websites		

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

Group (50 - 100)	**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 Information
معلومات المادة الدراسية

Module Title	**Thermodynamics II**	**Module Delivery**	
Module Type	**S**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ERE2411**		
ECTS Credits	**6**		
SWL (hr/sem)	١٥٠		

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ali Jaber Abdulhamed	**e-mail**	msb.ali.jaber@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of Entropy. 2. To understand of 2nd law of thermodynamics. 3. To understand exergy. 4. To develop problem solving skills and understanding of Isentropic Efficiency of Turbine, nozzle, compressor & pump. 5. To develop problem solving skills and understanding of power plant cycles. 6. To develop problem solving skills and understanding of refrigerant cycles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know what the entropy. 2. Recognize how the 1st law of thermodynamics works in open system SSSF. 3. Recognize between energy and exergy. 4. Know the Isentropic Efficiency of Turbine, nozzle, compressor & pump. 5. Know the principles of power plant cycles. 6. Know the principles of refrigerant cycles. 7. Recognize between engine and refrigerant cycles.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Introduction, Definition, reversible processes, irreversible processes, irreversibility, entropy, general notices. Open System Unsteady State Steady Flow (U.S.S.S.F.) **[20 hrs]** • Second law of thermodynamics, close systems, open systems, exergy . **[15 hrs]** • Isentropic Efficiency of Turbine, nozzle, compressor & pump. **[20 hrs]** • Power plant cycles, refrigerant cycles. **[20 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	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	5
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% (20)	5 and 10	LO #1 - #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	11	LO #3, #5 and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #4
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري

	Material Covered
Week 1	Some Concept and Definitions
Week 2	Open System Unsteady State Steady Flow (U.S.S.S.F.)
Week 3	Entropy
Week 4	Reversible Processes
Week 5	The 2nd law of thermodynamic in close system
Week 6	The 2nd law of thermodynamic in open system
Week 7	Exergy
Week 8	Mid-term Exam
Week 9	Isentropic Efficiency of Turbine
Week 10	Isentropic Efficiency of Compressors & Pump, and Nozzle
Week 11	The Ideal Cycle for Gas-Turbine Engines (Brayton Cycle)
Week 12	Rankin Cycle "Steam Power Plant"
Week 13	The Ideal Reheat Rankin Cycle
Week 14	The Ideal Regenerative RANKINE Cycle
Week 15	Refrigerant cycles
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Determining the volumetric expansion coefficient of liquids
Week 2	Lab 2: Converting electrical energy into heat energy– Measuring with a voltmeter and an ammeter (Joule equivalent)
Week 3	Lab 3: Heat engine (Carnot cycle).
Week 4	Lab 4: Refrigerant cycles
Week 5	Lab Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamental of Classical Thermodynamics / Van Wylen	Yes
Recommended Texts	Thermodynamics: an Engineering Approach / Yunus Cengel	Yes
Websites	https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Thermodynamics%3A+an+Engineering+Approach&btnG=	

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 Information معلومات المادة الدراسية					
Module Title	**Fluid Mechanics II**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ERE2412**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Sanaa Abdulrazaq Jassim		**e-mail**	met.sanaa.abd@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	PHD	
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics I	**Semester**	3
Co-requisites module	None	**Semester**	

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

Module Objectives أهداف المادة الدراسية	1) To study the fluid mechanics in dynamic science, and why study fluid mechanics, and to understand principle equations for motion. 2) To learn energy equation of fluids in dynamic. 3) Study the applications of continuity and energy equations of fluid, the use of different devices to measure flow rate in closed and open systems. 4) study the Resistance to flow in open and closed conduits, 5) To define Flow in pipes (laminar and turbulent flow). Classify types of losses through pipes flow and calculating them. 6) To learn momentum equations of fluids in dynamic, and their applications. 7) to study Introduction to pumps and Turbines, Application, - Types of pumps and Turbines and types of joining systems. 8) Understand Dimensional analysis - Dimensional analysis (the π-theorem). Dimensionless parameters (Reynolds no., Froude no…..etc.) 9) to carry testing of fluids , measuring fluid flow by venture, measuring major and minor losses in pipe flow, test parallel and series systems of pumps, measuring impact of water jet.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To understand Steady-state energy equation, draw its energy line and hydraulic line. 2- Applications of continuity and energy equations, flow measurements through closed and open systems. 3- Study Resistance to flow in open and closed conduits. 4- Define Flow in pipes (laminar and Turbulent flow) 5- Calculate Losses in pipes (major and minor losses). 6- Define pumps and Turbines, Types of pumps and Turbines and application . Systems of joining. 7- Understand momentum equations of fluids in dynamic. Calculate momentum force at open and closed systems and their applications 8- Define Dimensional analysis - Dimensional analysis by (the π-theorem). Dimensionless parameters (Reynolds no. , Froude no…..etc.) 9- With regard to the practical side, the program aims to familiarize students with experiments related to flow measurement by venture, measurement of major losses of energy of pipe flow, measuring pressure and flow rate through pipe for pumps at series and parallel, measuring impact of water jet.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Steady state energy equation and application of it with continuity equation through open and closed systems (flow measurements) . [20 hr]. • Study the study Resistance to flow in open and closed conduits. Define Flow in pipes (laminar and turbulent flow) and Calculate Losses in pipes (major and minor losses). [20 hr] • Define pumps and Turbines, Types of pumps and Turbines and applications, systems of joining. [10 hr]. • Understand momentum equations of fluids in dynamic. Calculate momentum force at open and closed systems and their applications. [15 hr] • Define Dimensional analysis - Dimensional analysis by (the π-theorem). Dimensionless parameters(Reynolds no., Froude no…..etc) [10 hr]

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	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	**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%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Steady-state energy equation
Week 2	Flow Measurement in closed conduits by (Pitot tube), (Venturi meter)
Week 3	Flow Measurement in closed conduits by (orifice meter), (nozzle)
Week 4	Flow Measurement in open conduits by weirs different types of weirs , with applications,.
Week 5	Resistance to flow in closed conduits
Week 6	Resistance to flow in open conduits,
Week 7	Flow in pipes (laminar and Turbulent flow) (Mid-term Exam)
Week 8	Losses in pipes (major and minor losses) (Moody chart)
Week 9	Liner momentum equation and its Application
Week 10	Momentum in Open system (fixed and moving blades).
Week 11	Momentum in Closed system (bend pipes)
Week 12	Introduction to pumps and Turbines. Application, - Types of pumps and Turbines and application
Week 13	Connection between pumps, series and parallel.
Week 14	Dimensional analysis .Dimensional analysis (the π-theorem)
Week 15	Dimensionless fluid parameters(Reynolds no., Froude no…etc.)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) الاسبوعي للمختبر	
	Material Covered
Week 1	Experiment 1: Bernoulli′s theorem demonstration
Week 2	None
Weeks 3-	Experiment 2: Flow through venture meter.
Week 4-7	None
Week 8	Experiment 3: major losses in pipes.
Week 9	Experiment 4: minor losses in pipes

Week 10	Experiment 5: Impact of jet water
Week 11	Experiment 6: The difference between series and parallel connection of pumps.
Week 12-15	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Frank M. White, Fluid Mechanic, fifth edt.,	Yes
Recommended Texts	1- ATextbook of Fluid Mechanics And Hydraulic Machines. 2010 2- FLUID MECHANICS FOR ENGINEERS , 2011	No
Websites	https://www.infobooks.org/free-pdf-books/engineering/fluid-mechanics/ https://www.academia.edu/20207960/Fluid_Mechanics_Textbook	

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

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Module Information معلومات المادة الدراسية		
Module Title	**Electronic Circuits**	**Module Delivery**
Module Type	**S**	

Module Code	**ERE2403**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
ECTS Credits	**4**	
SWL (hr/sem)	**100**	

Module Level	UGII	**Semester of Delivery**	Three
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ahmed Mohammed Merza	**e-mail**	ahmed.hatrush@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Lecture	**Module Leader's Qualification**	MSC
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand conduction using electron and hole theory. 2. Develop a clear understanding of the basic operation and characteristics of a diode in the no-bias, forward-bias, and reverse-bias regions. 3. Be able to describe the difference between *n* - and *p* -type materials. 4. Understand the concept of load-line analysis and how it is applied to diode networks. 5. Become familiar with the use of equivalent circuits to analyze series, parallel, and series-parallel diode networks. 6. Understand the process of rectification to establish a dc level from a sinusoidal ac input. 7. Become familiar with the basic construction and operation of the Bipolar Junction Transistor. 8. Be able to determine the dc levels for the variety of important BJT configurations. 9. Become familiar with the construction and operating characteristics of Junction Field Effect (JFET), Metal-Oxide Semiconductor FET (MOSFET), and Metal-Semiconductor FET (MESFET) transistors. 10. Be able to perform a dc analysis of JFET, MOSFET, and MESFET networks. 11. Become acquainted with the small-signal ac model for a JFET and MOSFET.

	1. Understanding of the basic principles and concepts of electronic circuits. 2. Ability to design and analyze electronic circuits using various electronic components. 3. Ability to troubleshoot electronic circuits and identify faults. 4. Knowledge of different types of electronic circuits, such as analog and digital circuits, and their applications.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Knowledge of different types of electronic devices, such as transistors, diodes, and operational amplifiers, and their applications in electronic circuits. 6. Understanding of safety measures while working with electronic circuits. 7. Ability to apply the knowledge and skills learned in electronic circuits to create various electronic systems. 8. Development of critical thinking and problem-solving skills. 9. Preparation for pursuing a career in electronics engineering or related fields.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. **Semiconductor diode:** Introduction, semiconductor materials: Ge, Si, AND GaAs, covalent bonding and intrinsic materials, energy levels, n -type and p -type materials, semiconductor diode, diode equivalent circuits, reverse recovery time, diode testing, Zener diodes, light-emitting diodes, **Diode Applications:** introduction, load-line analysis, series diode configurations, parallel and series–parallel configurations, and/or gates, sinusoidal inputs; half-wave rectification, full-wave rectification, clippers, clampers, Zener diodes, voltage-multiplier circuits. [8 hrs] **Bipolar Junction Transistors:** introduction**,** transistor construction, transistor operation, Common-Base Configuration, Common-Emitter Configuration, Common-Collector Configuration, Limits of Operation, Transistor Specification Sheet, Transistor Testing, **DC Biasing—BJTs**: Fixed-Bias Configuration, Emitter-Bias Configuration, Voltage-Divider Bias Configuration, Collector Feedback Configuration, Emitter-Follower Configuration, Common-Base Configuration. [8 hrs] **Field-Effect Transistors**: Construction and Characteristics of JFETs, Transfer Characteristics, Important Relationships, Depletion-Type MOSFET, Enhancement-Type MOSFET, **FET Biasing:** Introduction, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, Common-Gate Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs. [6 hrs] **FET Amplifiers:** FET Amplifiers, Introduction, JFET Small-Signal Model, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Configuration, Common-Gate Configuration, Source-Follower (Common-Drain) Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs, MOSFET Drain-Feedback Configuration, E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks, Operational Amplifier: Introduction, Differential Amplifier Circuit, Op-Amp Basics, Practical Op-Amp Circuits. [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	3 and 12	LO #3, #4 and #6, #7

	Projects	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%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1&2	**Semiconductor diode:** Introduction, semiconductor materials: Ge, Si, AND GaAs, covalent bonding and intrinsic materials, energy levels, n -type and p -type materials, semiconductor diode, diode equivalent circuits, reverse recovery time, diode testing, Zener diodes, light-emitting diodes
Week 3&4	**Diode Applications:** introduction, load-line analysis, series diode configurations, parallel and series–parallel configurations, and/or gates, sinusoidal inputs; half-wave rectification, full-wave rectification, clippers, clampers, Zener diodes, voltage-multiplier circuits.
Week5& 6	**Bipolar Junction Transistors:** introduction**,** transistor construction, transistor operation, Common-Base Configuration, Common-Emitter Configuration, Common-Collector Configuration, Limits of Operation, Transistor Specification Sheet, Transistor Testing.
Week 7&8	**DC Biasing—BJTs**: Fixed-Bias Configuration, Emitter-Bias Configuration, Voltage-Divider Bias Configuration, Collector Feedback Configuration, Emitter-Follower Configuration, Common-Base Configuration.
Week 9	**Field-Effect Transistors**: Construction and Characteristics of JFETs, Transfer Characteristics, Important Relationships, Depletion-Type MOSFET, Enhancement-Type MOSFET.
Week 10& 11	**FET Biasing:** Introduction, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, Common-Gate Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs.
Week 12&13	**FET Amplifiers:** FET Amplifiers, Introduction, JFET Small-Signal Model, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Configuration, Common-Gate Configuration, Source-Follower (Common-Drain) Configuration.
Week 14	Depletion-Type MOSFETs, Enhancement-Type MOSFETs, MOSFET Drain-Feedback Configuration, E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks.
Week 15	Operational Amplifier: Introduction, Differential Amplifier Circuit, Op-Amp Basics, Practical Op-Amp Circuits.
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Diode characteristics
Week 2	half-wave rectification, full-wave rectification
Week 3&4	clippers, clampers, Zener diodes, voltage-multiplier circuits
Week 5	Bipolar Junction Transistors:, Common-Base Configuration, , Common-Collector Configuration.
Week 6	Common-Emitter Configuration, Transistor Testing.
Week 7	FET Biasing: Fixed-Bias Configuration, Self-Bias Configuration, ,
Week 8	FET Biasing: Voltage-Divider Biasing, Common-Gate Configuration
Week 9	Depletion-Type MOSFETs, Enhancement-Type MOSFETs.
Week 10&11	Operational Amplifier: Differential Amplifier Circuit, Op-Amp Basics,
Week 12 - 14	Practical Op-Amp Circuits.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	***Electronic Devices and Circuit Theory, Eleventh Edition Robert L. Boylestad and Louis Nashelsky***	No
Recommended Texts		
Websites		

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

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

Module Information معلومات المادة الدراسية				
Module Title	**Principles of Energy Engineering**		**Module Delivery**	
Module Type	**C**		☒ **Theory**	
Module Code	**ERE2404**		☐ **Lecture**	
ECTS Credits	**6**		☐ **Lab**	
SWL (hr/sem)	**150**		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Four	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	

Module Leader	Wisam J. Khudhayer	**e-mail**	Met.wisam.j@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1) Develop an understanding of the concepts of energy, power and work 2) Understand the conservation law of material / energy and perform material / energy balance in energy systems. 3) Enable students to identify and apply fundamental principles of chemistry and physics, as they pertain to energy and fuels, and mathematics to describe materials and energy flow through a process. 4) Enable students to describe the energy transformations in energy systems. 5) In addition, the course will present an introduction to chemical kinetics with an overview of solid, liquid and gaseous fuel transformations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the concepts of energy, power, and work 2- Identify the main energy forms 3- Recognize the differences between renewable and non-renewable resources 4- An ability to apply knowledge of mathematics, science, and engineering in Energy-related disciplines 5- An ability to apply material balance on energy-related systems 6- An ability to apply energy balance on energy-related systems 7- Understanding the fundamentals of electrochemical energy conversion
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. Principles of energy engineering course will cover the basic engineering calculation and mathematical methodologies on material and energy balances and reaction rates during chemical transformations in energy systems. This is a required introductory course to the BS in energy engineering degree program. Students will be evaluated based on quizzes, homework, class participation, writing report, interactive tutorial and Mid-term and final exams.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage student's participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through lectures, interactive tutorials, assignments, quizzes, and by considering various activities that are interesting to the students such as case-study, seminars, take-home exam, and industrial visits.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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, 9 and 13	LO #1-3, #4 and #5-7
	Assignments	2	10% (10)	4 and 8	LO #5, #6, and #7
	Interactive Tutorial	2	10%(10)	6 and 10	LO #5, #6, and #7
	Report	1	10% (10)	13	LO #5, #6, and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Energy Engineering, Energy, Power, and work Definitions
Week 2	The Law of mass/energy Conservation, Energy Forms, Renewable and non-Renewable Resources.
Week 3	Introduction to Engineering Calculations: Units and Dimensions, The Mole Unit
Week 4	Conventions in Methods of Analysis and Measurements, and Basis.
Week 5	The Chemical Equation and stoichiometry,
Week 6	The Material Balance with/without Chemical Reactions
Week 7	Solving Material Balance Problems Involving Multiple Subsystems,
Week 8	Recycle, By pass, and Purge Calculations
Week 9	Energy Balances, Concepts and Units,
Week 10	Heat Capacity, calculation of enthalpy Changes (without change of phase), and Enthalpy Changes for Phase Transitions
Week 11	The General Energy Balance
Week 12	Reversible Processes and the Mechanical Energy Balance
Week 13	Energy Balance with Chemical Reactions
Week 14	Electrochemical Energy Conversion I
Week 15	Electrochemical Energy Conversion II
Week 16	**Preparatory week before the final Exam**

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

Required Texts	1. David M. Himmelblau, "Basic Principles and Calculations in Chemical Engineering", Fifth Edition, Prentice-Hall International Editions, 1989. 2. Albert P.E. Thumann, "Fundamentals of Energy Engineering" Prentice-Hall 1984 3. Introduction to Energy Engineering, Mihir Sen, Department of Aerospace and Mechanical Engineering, University of Notre Dame Notre Dame, IN 46556 December 2, 2015	YES
Recommended Texts	Colorado Energy Management Handbook, Sixth Edition, 2007, by The Fairmont Press, Colorado, USA.	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

Module Information
معلومات المادة الدراسية

Module Title	**Engineering Mathematics II**	**Module Delivery**
Module Type	**S**	☒ **Theory**
Module Code	**ERE2416**	☐ **Lecture**
ECTS Credits	**4**	☐ **Lab**
SWL (hr/sem)	**100**	☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohammed Ali Al-Shuraifi	**e-mail**	Msb.Mohammed.Ali@uobabylon.edu.iq
Module Leader's Acad. Title	Lecture	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	2.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics	**Semester**	1
Co-requisites module	Applied Mathematics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	8. Understanding the basic concepts of calculus, differential equations, and linear algebra. 9. Applying mathematical principles to solve engineering problems. 10. Developing skills in mathematical modeling and simulation. 11. Understanding the role of mathematics in engineering design and analysis. 12. Developing critical thinking and problem-solving skills. 13. Developing effective communication skills in mathematics. 14. Understanding the importance of mathematical accuracy and precision in engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	17. Understanding the concept of vectors and their representation in two and three dimensions. 18. Being able to perform vector operations such as addition, subtraction, scalar multiplication, dot product, and cross product. 19. Understanding the concept of periodic functions and their representation using Fourier series. 20. Learning the techniques to calculate Fourier coefficients and Fourier series. 21. Applying Fourier series to solve problems in signal processing, heat transfer, and wave propagation. 22. Understanding the concept of Fourier transform and its applications. 23. Understanding the properties of Fourier transform, such as linearity, time shifting, and frequency shifting 24. Understand the basic concepts and terminology of differential equations. 25. Solve first-order differential equations using various techniques such as separation of variables, integrating factors, and exact equations. 26. Solve second-order differential equations with constant coefficients using various techniques such as characteristic equations and undetermined coefficients. 27. Solve higher-order differential equations and systems of differential equations. 28. Understanding the concept of Laplace transform and its application in solving differential equations. 29. Ability to transform time-domain signals into frequency-domain signals using Laplace transform. 30. Understanding the properties of Laplace transform, such as linearity, time shifting, differentiation, integration, convolution, and initial and final value theorems.

	31. Understanding the concepts of sequences and series, including arithmetic and geometric sequences, and the sum of a finite and infinite series. 32. Solving problems involving sequences and series, such as finding the nth term, the sum of the first n terms, and the limit of a sequence.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following**. • Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations. Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector. [8 hrs] • **Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering. **Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications. [16 hrs] • **Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point. **Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations. [20 hrs] • **Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.[12 hrs] • **Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	3 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

Summative assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations.
Week 2	**Vector Analysis**: Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector**.**
Week3& 4	**Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering.
Week 5&6	**Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications.
Week 7&8	**Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point.
Week 9 & 10& 11	**Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations
Week 12 &13&14	**Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.
Week 15	**Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	***Advanced Engineering Mathematics (Muhadharaty)***	No
Recommended Texts	Engineering-mathematics-ii-2009-cuppy	No
Websites		

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

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

Module Information معلومات المادة الدراسية					
Module Title	**Computer Programming (MATLAB)**			**Module Delivery**	
Module Type	**E**			☒ **Theory**	
Module Code	**ERE2405**			☐ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Ahmed Hadi Hussain	**e-mail**	Met.ahmed.hadi@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.		
Module Tutor		**e-mail**	E-mail		
Peer Reviewer Name		**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of differential equations and their solving in practical problems. 2. To understand plotting of functions from a given data. 3. This course deals with the basic concept of Graphic 2D and 3D. 4. This is the basic subject for all methods of differential forms. 5. To understand matrixes and limits Laws problems. 6. To perform mesh and fundamentals of 3D graphs..

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the classification of functions with their solving. 2. List the various terms associated with the plotting of functions. 3. Summarize what is meant by differential and integration forms in different applications. 4. Define differential and integral forms in matlab. 5. Identify the basic Looping with for and while, controlling loops with break and continue, terminating execution with return. 6. Discuss the operations of matrices.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Getting Started to Matlab 2- Structured Programming 3- Matlab Basic Program Components 4- Derivatives & integration and Applications of them 5- Program Control Units 6- Matrices and their types 7- System of linear equation 8- Matlab Graphics 2D 9- Solving systems of linear equations 10- Matlab Graphics 3D

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	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Getting Started to Matlab
Week 2	Structured Programming

Week 3	Interviewing the basic classes in MATLAB, how MATLAB handles matrices as the major variables in the program, basic operations
Week 4	Matlab Basic Program Components
Week 5	The student should get reasonable information of how to use Matlab for structured programming; therefore, structured programming fundamentals are defined before going forward with Matlab
Week 6	Defining Recursive Functions in Matlab
Week 7	Matrices, Matrix and Operations on them (Mid-term Exam)
Week 8	System of linear equation
Week 9	Linear Algebra: First Order Systems
Week 10	Matlab Graphics 2D
Week 11	Matlab Graphics 3D
Week 12	Solve of system linear equations, gauss-eliminations, gauss-Jordan eliminations, grammar Rull
Week 13	Functions of a single or more than single variable ,Plot one dimensions and two dimensions
Week 14	Program Control Units
Week 15	Looping with for and while, controlling loops with break and continue, terminating execution with return
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Write function : Introducing how to define a function in Matlab. Building and calling a function with different headers through variable arguments
Week 2	Lab 2: types of matrices and Solve of system linear equations by using gauss-eliminations, gauss-Jordan eliminations, grammar Rull
Week 3	Lab 3: Application of recursion with mathematics, using functions to solve serial equations.
Week 4	Lab 4: Looping with for and while, controlling loops with break and continue, terminating execution with return
Week 5	Lab 5: Handling the first order equations and some examples to solve mathematical methods. Differential equations and how Matlab manipulates them are the discussed, in addition to using more properties of the plotting function
Week 6	Lab 6: Basic 2D graphics, various approaches to generate two dimensions graphics.
Week 7	Lab 7: Basic 3D graphics, fundamentals of 3D graphs.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Essential matlab for engineers and scientist (fifth edition) by Brian H. Hahn and Daniel T. Valentine.	Yes
Recommended Texts	Basic of Matlab and beyond by Andrew Knight	No
Websites	https://www.mathworks.com/academia/courseware/teaching-first-year-engineering-with-matlab-and-simulink.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	**التقدير**	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Module Information
معلومات المادة الدراسية

Module Title	**Computer Science II**	**Module Delivery**	
Module Type	**B**		☐ **Theory**
Module Code	**UOBAB2004**		☒ **Lecture**
ECTS Credits	**3**		☒ **Lab**
SWL (hr/sem)	**75**		☐ **Tutorial**
			☒ **Practical**
			☒ **Seminar**

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Omar Ahmed Naeem	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Omar Ahmed Naeem	**e-mail**	Msb.omar.alkawak@uobabylon.edu.iq
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	2.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

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

Module Objectives أهداف المادة الدراسية	The computer science curriculum aims to introduce the student to computer science and the skills related to this subject. The main purpose of the course is to introduce the student to an idea about the computer Networking and its Security and Networking components and how each of its parts works through an explanation of the Security and Networking, E-Commerce, Computer Troubleshooting, Introduction to Al, The Role of Al in Modern Smartphones, Applications and Tools of Al, Al and Society, Ethical Challenges in Al, The Future of Al and protect against virus risks.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives A1- During the year, the student learns an idea about the computer Networking and its Security. A2- Enabling the student to know the main principles of the computer Networking and its Security. and the mechanisms used for their purpose. A 3- Enabling the student to know all the basics that he uses in the scientific subject A 4- Definition of computer, its development history and generations A 5- An explanation of the computer system with all its elements and systems A 6- Introducing the student to the input unit, its principles of work, its types, and the work of the programs A 7- Applications and Tools of Al b- The skill objectives of the subject B1 - Familiarity with developments in the field of AI B2 - Familiarity with Future of Al and protect against virus risks B3 - Enabling the student to understand every part of the computer, how it works, and the work of the basic office programs B4- Giving the student an opportunity to explain a small part of the class to his classmates to enhance his self-confidence. B5- Solve a small part of the homework to urge the students to complete the solution, give class assignments, and make groups to solve these assignments.
Indicative Contents المحتويات الإرشادية	The students will be able to identify the values, trends and patterns of behavior that uphold the ethics of the profession and work to adhere to them after graduation. 1-Urging the student to understand the objective of studying the subject in general. 2-Urging the student to think about how to develop oneself in the field of computers. 3 -Making the student able to deal with the AI tools and how to use the AI applications in accordance with the rules and regulations of engineering.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. The teacher prepares lectures on the subject in soft electronic form and presents them to the students. 2. The teacher gives lectures in detail. 3. the teacher requests periodic reports and homework on the basic subjects of the subject. 4. Academic methods and lectures 5. Dialogue modalities 6. Use projectors 7. Providing the student with basic and secondary topics related to computer work 8. Translating theoretical topics and vocabulary related to computer technologies 9. Requiring the student to follow developments in computer science

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	44	**Structured SWL (h/w)**	3

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	Continuous	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	Continuous	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	Continuous	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	Continuous	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Security and Networking
Week 2	Security and Networking (Cont.)
Week 3	E-Commerce
Week 4	Computer Troubleshooting
Week 5	Computer Troubleshooting (Cont.)
Week 6	Introduction to Al
Week 7	Introduction to Al (Cont.)
Week 8	The Role of Al in Modern Smartphones
Week 9	**Midterm Exam**
Week 10	Applications and Tools of Al
Week 11	Applications and Tools of Al (Cont.)
Week 12	Applications and Tools of Al (Cont.)
Week 13	Al and Society
Week 14	Ethical Challenges in Al
Week 15	The Future of Al
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	What is a network? Types of networks. Basic network components
Week 2	Network Security Basics. Understanding network threats. Network Troubleshooting
Week 3	Concepts of Electronic banking services this include online banking: ATM and debit card services.
Week 4	Introduction to Computer Troubleshooting, Common Hardware Issues and Solutions, Diagnosing Software Problems
Week 5	Troubleshooting Operating System Issues, Identifying and Resolving Blue Screen Errors, Dealing with Slow Computer Performance. Virus and Malware Removal Techniques, Updating Drivers and Software.
Week 6	Definition of Al, History of Al, Al Techniques and Approaches.
Week 7	Al Tools and Frameworks.

Week 8	Al-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa)
Week 9	**Midterm Exam**
Week 10	Overview of Al Applications in Various Industries, Education and Healthcare.
Week 11	Al in Image and Video Analysis, Smart Cities
Week 12	Future Trends in Al Applications and Tools.
Week 13	Introduction to Al and Its Societal Impact, The Role of Al in Enhancing Public Safety.
Week 14	Introduction to Ethics in Al, Transparency and Explainability of Al Systems, Privacy Concerns in Al Data Usage
Week 15	Future trends in Al, recent research and emerging technologies.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1.Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology™, 3rd Edition (2020) 2.Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete",16th Edition (2020). 3.Lectures provided by the subject teacher	No
Recommended Texts	1. William Stallings, Computer Organization & Architecture, Sixth edition, Person Education 2. Donald H. Sandersz, Computer today, Second edition, McGraw –hill 3. Lectures provided by the subject teacher 4. Books available in the college library	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language II**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOBAB2001**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Noor Mohammed Jasim		**e-mail**	msb.noor.mohammed@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	2.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١. اتقان اللغة: الهدف الرئيسي من أهداف الوحدة في اللغة العربية هو مساعدة المتعلمين على تطوير الكفاءة في القراءة والكتابة والتحدث والاستماع إلى اللغة العربية. وهذا يشمل تحسين المفردات والقواعد والنطق ومهارات الفهم. ٢. مهارات الاتصال: هدف آخر هو تعزيز قدرة المتعلمين على التواصل الفعال باللغة العربية. يتضمن ذلك التركيز على الاستخدام العملي للغة ، مثل الانخراط في المحادثات والتعبير عن الآراء وطرح الأسئلة والإجابة عليها والمشاركة في أنشطة التواصل المختلفة. ٣. التفاهم الثقافي: قد تهدف أهداف الوحدة أيضًا إلى تعزيز التفاهم الثقافي والوعي بالعالم العربي. ويشمل ذلك تعريف المتعلمين بالعادات والتقاليد والأدب والتاريخ والجوانب الاجتماعية المرتبطة بالدول الناطقة باللغة العربية. ٤. استخدام اللغة الوظيفية: يمكن أن يكون الهدف من أهداف الوحدة هو تزويد المتعلمين بالمهارات اللغوية اللازمة لأداء مهام أو وظائف محددة باللغة العربية. قد يتضمن ذلك تعلم المفردات والعبارات المتعلقة بموضوعات مثل السفر والتسوق وتناول الطعام والرعاية الصحية والتفاعلات التجارية. ٥. الدقة اللغوية: قد تؤكد أهداف الوحدة على تطوير الدقة النحوية والاستخدام السليم للغة. يتضمن ذلك تعلم قواعد وهياكل قواعد اللغة العربية ، وبناء الجملة ، والصرف لإنتاج جمل متماسكة وخالية من الأخطاء. ٦. التعلم المستقل: هدف آخر هو تعزيز قدرة المتعلمين على دراسة واستكشاف اللغة العربية بشكل مستقل خارج الفصل الدراسي. يمكن أن يشمل ذلك تشجيع التعلم الذاتي ، وتوفير الموارد لمزيد من الممارسة ، وتطوير استراتيجيات لاكتساب اللغة بشكل فعال. ٧. التقييم والتقدم: قد تهدف أهداف الوحدة أيضًا إلى تقييم تقدم المتعلمين وتقديم ملاحظات حول مهاراتهم في اللغة العربية. يسمح هذا لكل من المتعلمين والمدربين بتقييم إنجازاتهم وتحديد مجالات التحسين

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. الفهم السمعي: إظهار القدرة على فهم وفهم اللغة العربية المنطوقة عبر مجموعة من الموضوعات والسياقات ، بما في ذلك المحادثات والعروض التقديمية والتسجيلات الصوتية. ٢. الفهم القرائي: إظهار القدرة على قراءة وفهم النصوص العربية المكتوبة بمستويات مختلفة من الصعوبة ، مثل المقالات والقصص والمواد الأصلية ، واستخراج المعلومات ذات الصلة. ٣. إتقان التحدث: التواصل الفعال باللغة العربية من خلال التعبير عن الأفكار والآراء والمعلومات في شكل منطوق. الانخراط في المحادثات والمشاركة في المناقشات وتقديم العروض باستخدام المفردات والقواعد والنطق المناسب. ٤. إتقان الكتابة: إنتاج نصوص مكتوبة باللغة العربية ، مثل المقالات والتقارير ورسائل البريد الإلكتروني والرسائل ، بوضوح وتماسك ودقة نحوية. قم بتطبيق اصطلاحات اللغة المناسبة ، بما في ذلك التهجئة وعلامات الترقيم وبنية الفقرة. ٥. المفردات والقواعد: إظهار مجموعة واسعة من المفردات وفهم قواعد قواعد اللغة العربية وهياكلها. استخدم المفردات المناسبة للتعبير عن الأفكار والأفكار بدقة ، وتطبيق القواعد النحوية بشكل فعال في الاتصال الكتابي والمنطوق. ٦. الوعي الثقافي: إظهار فهم للجوانب الثقافية للبلدان الناطقة باللغة العربية ، بما في ذلك العادات والتقاليد والأعراف الاجتماعية. التعرف على الاختلافات الثقافية واحترامها وتطبيق المعرفة الثقافية بشكل مناسب في استخدام اللغة. ٧. الطلاقة اللغوية: تنمية الطلاقة في اللغة العربية من خلال التحدث والرد بشكل عفوي ، دون تردد مفرط. أظهر القدرة على الحفاظ على المحادثة والتفاوض بشأن المعنى والتعامل مع مواقف الاتصال المختلفة بثقة. ٨. التفكير النقدي: تطبيق مهارات التفكير النقدي لتحليل وتقييم النصوص العربية ، بما في ذلك المقالات الإخبارية ، والأعمال الأدبية ، والمواد الثقافية. صياغة الآراء ودعمها ، وإقامة الروابط ، وإظهار الفهم وراء مستوى الفهم السطحي. ٩. التعلم المستقل: تحمل مسؤولية التعلم الذاتي من خلال استخدام الموارد والاستراتيجيات لتطوير إتقان اللغة العربية. إظهار القدرة على الانخراط في التعلم الذاتي للغة والبحث عن فرص للتحسين المستمر. ١٠. التواصل بين الثقافات: الانخراط في التواصل الفعال بين الثقافات من خلال إظهار فهم الاختلافات الثقافية ، وتكييف استخدام اللغة وفقًا لذلك ، وإظهار الاحترام لوجهات النظر المتنوعة.
Indicative Contents المحتويات الإرشادية	المبتدأ والخبر أن يكون الطالب جملة فيها مبتدأ وخبر , التصويبات اللغويةأن يتعرف الطالب على التصويبات اللغوية علامات الترقيم أن يستعمل الطالب علامات الترقيم وجوب فتح همزه ان وكسرها أن يتعرف الطالب موقع فتح همزة ان وكسرها الادب القصصي أن يتعرف الطالب على الادب القصصي الادب العربي زيادة الثروة اللغوية للطالب الشعر الحر والشعر العمودي أن يفرق الطالب بين الشعر العمودي والحر العدد أن يكتب الطالب العدد بشكل صحيح حافظ ابراهيم أن يترجم الطالب لحياة الشاعر حافظ ابراهيم بدر شاكر السياب أن يترجم الطالب لحياة الشاعر بدر شاكر السياب الجواهري أن يترجم الطالب لحياة الشاعر الجواهري أن يستخرج الطالب همزة القطع همزة القط

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	النهج التواصلي: التأكيد على استخدام اللغة العربية للتواصل الهادف. شجع المتعلمين على الانخراط في محادثات حقيقية ولعب الأدوار وأنشطة التواصل التي تعكس مواقف الحياة الواقعية. توفير فرص للتفاعل الهادف باللغة العربية لتطوير مهارات التحدث والاستماع. المهارات المتكاملة: دمج المهارات اللغوية الأربع (الاستماع والتحدث والقراءة والكتابة) في عملية التدريس والتعلم. قم بإنشاء أنشطة تسمح للمتعلمين بممارسة هذه المهارات وتعزيزها في وقت واحد. على سبيل المثال ، قراءة نص بصوت عالٍ ومناقشته ثم كتابة رد. مواد أصلية: دمج المواد العربية الأصيلة ، مثل المقالات الإخبارية والأدب والأغاني ومقاطع الفيديو والبودكاست ، في المناهج الدراسية. تعرض هذه المواد المتعلمين لاستخدام اللغة الواقعية والجوانب الثقافية للمجتمعات الناطقة باللغة العربية ، مما يعزز كفاءتهم اللغوية وفهمهم الثقافي. التعلم السياقي: تعليم اللغة العربية في سياقات ذات مغزى تتعلق بحياة المتعلمين أو مجالات اهتمامهم. استخدم الموضوعات والموضوعات والمواقف ذات الصلة لجعل تجربة تعلم اللغة أكثر جاذبية ووثوقية للمتعلمين. مناهج متعددة الوسائط: استخدم مجموعة متنوعة من الموارد والوسائط لتلبية أنماط التعلم المختلفة. اجمع بين الأنشطة البصرية والسمعية والحركية لتعزيز تعلم اللغة. قم بدمج أدوات الوسائط المتعددة وتطبيقات تعلم اللغة والموارد عبر الإنترنت والأنشطة التفاعلية لإنشاء بيئة تعليمية جذابة. التعلم القائم على المهام: تنظيم تعلم اللغة حول المهام الهادفة التي تتطلب من المتعلمين استخدام اللغة العربية لتحقيق أهداف محددة. يمكن أن تشمل المهام التخطيط لرحلة أو وصف تجربة شخصية أو المشاركة في مناقشة. يعزز هذا النهج استخدام اللغة ومهارات حل المشكلات

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	20	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects				
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	2hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	أن يكون الطالب جملة فيها مبتدأ وخبر
Week 2	أن يتعرف الطالب على التصويبات اللغوية
Week 3	أن يستعمل الطالب علامات الترقيم
Week 4	أن يتعرف الطالب موقع فتح همزة ان وكسرها
Week 5	أن يتعرف الطالب على الادب القصصي
Week 6	الامتحان الفصلي
Week 7	زيادة الثروة اللغوية للطالب
Week 8	أن يفرق الطالب بين الشعر العمودي والحر
Week 9	أن يكتب الطالب العدد بشكل صحيح
Week 10	أن يترجم الطالب لحياة الشاعر حافظ ابراهيم
Week 11	أن يترجم الطالب لحياة الشاعر بدر شاكر السياب
Week 12	أن يترجم الطالب لحياة الشاعر الجواهري
Week 13	أن يستخرج الطالب همزة القطع
Week 14	أن يستعمل الطالب همزة الوص
Week 15	أن يكون الطالب جملة فيها مبتدأ وخبر
Week 16	الامتحان النهائي

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	١- عليوي ، سعد حسن ، النحو الوسيط ، ط١ ، دار صفاء للنشر والتوزيع ، عمان –الاردن ، ٢٠١٥. ٢- النحوي ، ابن عقيل ، شرح ابن عقيل على الفية ابن مالك ، ط١ ، دار الكتب العلمية ، بيروت - لبنان ، ٢٠٠٦. ٣- ضيف ، شوقي ، تاريخ الادب العربي ، ط٢، دار المعارف للطباعة ، القاهرة ، ٢٠٠٦.	Yes
Recommended Texts	أ) الانصاري ، ابن هشام ، شرح قطر الندى وبل الصدى ، ط١ ، دار الهلال للنشر والتوزيع ، بيروت – لبنان ، ٢٠٠٩. ب) السامرائي ، فاضل صالح ، معاني النحو ، دار ابن كثير للنشر والتوزيع ، بيروت – لبنان ، ٢٠١٧.	No

Websites	وكيبيديا ، منتديات اللغة العربية

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.

المرحلة الثالثة/ ٢٠٢٥

الوقود والاحتراق

نموذج وصف المقرر

١. اسم المقرر
الوقود والاحتراق
٢. رمز المقرر
Em En Fci 303705 (2+0)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٦-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٣٠ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. فؤاد عبد الأمير خلف الآيميل :

٨. اهداف المقرر

اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات التفاعلية.: يمكن للمعلم تقديم المواد بشكل مباشر من خلال جلسات محاضرات. يمكن تحسين هذه الطريقة بمزج الشرح بالأمثلة التطبيقية وفتح المجال للأسئلة والمناقشات مع الطلاب. ٢. المشروعات والأبحاث.: يمكنك توجيه الطلاب لإجراء مشروعات أو أبحاث حول مواضيع محددة في منهج الوقود والاحتراق. هذه الطريقة تشجع على التعلم النشط والبحثي وتطبيق المفاهيم عملياً. ٣. المناقشات الجماعية.: يمكن تنظيم جلسات مناقشة حول مواضيع معينة في المنهج. يمكن للطلاب تبادل وجهات نظرهم والمشاركة في تبادل الأفكار والتحليل. ٤. التعلم القائم على المشكلات.: ضع تحديات ومشكلات معقدة تتعلق بمفاهيم المنهج، ثم دع الطلاب يعملون على حل هذه المشكلات باستخدام المفاهيم التي درسوها. ٥. التجارب العملية والمختبرات.: يمكن تنظيم تجارب عملية في المختبر تساعد الطلاب على تطبيق المفاهيم النظرية بشكل عملي وفهم كيفية التفاعلات الكيميائية. ٦. استخدام التكنولوجيا.: يمكن استخدام أدوات تكنولوجية مثل الأنماط البيانية والمحاكاة الرقمية لتوضيح المفاهيم والعمليات. ٧. النمذجة والمحاكاة.: استخدم برمجيات نمذجة ومحاكاة لتمثيل العمليات الكيميائية المعقدة وتمكين الطلاب من التفاعل معها. ٨. التعلم العكسي.: دع الطلاب يستكشفون المفاهيم مسبقاً ويأتون إلى الحصص جاهزين لمناقشة وتطبيق تلك المفاهيم. ٩. الأنشطة العملية.: قدم أنشطة تشمل الأمور العملية مثل تجربة الاحتراق الخاصة، والتحليل والتفسير لنتائج التجارب.

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم

Quizzes and Tests	Lectures	Introduction to Fuel and Combustion: Basics of combustion, types of fuels, and their importance in energy generation.	١	٢	١
Quizzes and Tests	Lectures	Types of Fuels: Exploration of various types of fuels, including fossil fuels (coal, oil, natural gas) and alternative fuels (biofuels, hydrogen, etc.).	١	٢	٢
Feedback and Formative Assessment	Lectures	Chemistry of Combustion: Understanding the chemical reactions involved in combustion, including the oxidation of fuels and the production of combustion products.	١	٢	٣
Feedback and Formative Assessment	Lectures &Active Learning	Stoichiometry of Combustion: Study of the balanced chemical equations representing combustion reactions and the calculation of reactants and products.	٣	٢	٤
Observations	Lectures &Active Learning	Heat of Combustion and Calorimetry: Concepts related to measuring and calculating the heat released during combustion reactions and the use of calorimetry.	٣	٢	٥
Self-Assessment	Lectures &Active Learning	Actual Cycle Engine & Working Principles	٣	٢	٦
Peer Assessment	Flipped Classroom	Flame and Flame Structure: Examination of flame characteristics, types of flames, and factors influencing flame behavior.	٣	٢	٧
Examinations	Flipped Classroom	Internal Combustion Engines: In-depth look into the principles of internal combustion engines, their types (spark-ignition, compression-ignition), and their efficiency.	٤	٢	٨
Peer Assessment	Flipped Classroom	External Combustion Processes: Study of external combustion processes such as steam power generation, gas turbines, and their applications.	٤	٢	٩
Portfolios	Inquiry-Based Learning	Combustion Kinetics: Exploration of the rate of combustion reactions, factors affecting it, and how it impacts the efficiency of combustion processes.	٤	٢	١٠
Portfolios	Peer Learning	IC-Fuel and combustion Introduction	٤	٢	١١
Assignments and Projects	Reflective Learning & Experimental Learning	Pollution and Emissions: Discussion of the environmental impact of combustion, including emissions of greenhouse gases, particulate matter, and methods to reduce pollutants.	٦	٢	١٢
Assignments and Projects	Reflective Learning & Experimental Learning	Energy Conversion and Efficiency: Understanding how combustion is used to convert chemical energy into mechanical work and the importance of efficiency in energy conversion.	٦	٢	١٣
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Advanced Combustion Techniques: Introduction to advanced combustion technologies such as fluidized bed combustion, lean-burn engines, and oxy-fuel combustion.	٦	٢	١٤
Examinations		Final Examination	٦	٢	

Quizzes and Tests	Lectures	Combustion Modeling and Simulation: Overview of computational methods used to model and simulate combustion processes for optimization and pollution reduction.	١	٢	
Quizzes and Tests	Lectures	Sustainable Energy Sources: Exploration of renewable energy sources as alternatives to traditional fossil fuels, including solar, wind, and biomass energy.	١	٢	
Feedback and Formative Assessment	Lectures	Fuel Cells and Combustion: Introduction to fuel cells as an alternative energy conversion technology and their relation to combustion processes.	١	٢	

١١. تقييم المقرر

١. الاختبارات الكتابية.: يمكن إجراء اختبارات كتابية تغطي المفاهيم الرئيسية في المنهج. يمكن أن تكون الأسئلة متنوعة مثل الأسئلة الاختيارية وأسئلة الإجابة القصيرة والأسئلة الشاملة.
٢. الاختبارات العملية.: قد تشمل اختبارات عملية حيث يقوم الطلاب بأداء مهام تطبيقية مثل حساب القيم الحرارية أو تحليل نتائج تجارب معينة.
٣. المشروعات والأعمال العملية.: يمكن تقييم الطلاب من خلال تقديمهم لمشروع أو عمل عملي، مثل تصميم عملية احتراق فعالة أو تقديم تقرير عن تأثير الاحتراق على البيئة.

٤. المشاركة في الفصل والنقاش.: يمكن تقييم مشاركة الطلاب في الأنشطة الجماعية والمناقشات في الفصل، ومدى إسهامهم في تبادل الأفكار والنقاشات.
٥. تقييم الأداء في المختبرات.: قد تقوم بتقييم الأداء والمهارات العملية للطلاب أثناء إجرائهم للتجارب في المختبر.
٦. تقييم المشروعات الكتابية والتقارير.: يمكن تقييم جودة المشروعات الكتابية والتقارير التي قام بها الطلاب حول مواضيع محددة.
٧. التقييم الشفهي.: يمكن تنظيم مقابلات شفهية مع الطلاب لمناقشة مفاهيم المنهج وتقييم فهمهم وقدراتهم على التطبيق.
٨. تقييم الأداء الفعلي.: يمكن تقييم الطلاب أثناء أداءهم لأنشطة عملية مثل تجارب الاحتراق أو التفاعل مع محاكيات.
٩. التقييم النهائي.: قد تستخدم هذه الطريقة لتقييم المفهوم العام الذي تم تعلمه من المنهج وتقدم الطلاب عبر الوقت.

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	In the following, some recommended books that cover the topics related to fuel and combustion: 1"..Introduction to Combustion". by Stephen R. Turns This is a comprehensive introductory textbook that covers the fundamentals of combustion processes, including chemical kinetics, thermodynamics, and various combustion technologies. 2"..Combustion Engineering Issues for Solid Fuel Systems". by Bruce G. Miller This book focuses on solid fuel combustion processes, discussing the principles, technologies, and environmental considerations for burning solid fuels like coal and biomass.

3"..Internal Combustion Engine Fundamentals". by John Heywood While mainly focused on internal combustion engines, this book provides an excellent overview of combustion processes, thermodynamics, and engine performance. 4"..Environmental Impact of Energy Consumption and Utilization: An Overview". by Stanislav Boldyryev and Yurij Kozar This book explores the environmental impact of energy consumption, including combustion-related pollution and the development of cleaner technologies. 5"..Introduction to Bioenergy". by Vaughn C. Nelson and Kenneth L. Starcher For those interested in biofuels, this book covers various aspects of bioenergy production, including feedstock selection, conversion processes, and sustainability. 6"..Introduction to Renewable Energy". by Vaughn C. Nelson and Kenneth L. Starcher This book provides insights into renewable energy sources like solar, wind, geothermal, and hydropower, which are essential alternatives to traditional fuels. 7"..Combustion Technology: Essentials of Flames and Burners". by A. A. Burluka, Alexander S. Rogachev, and Nickolai M. Rubtsov This book delves into the principles of combustion, including combustion theory, flame structure, and burner technologies. 8"..Combustion Science and Engineering". by Kalyan Annamalai, Ishwar K. Puri, and Milind A. Jog This book covers a wide range of topics related to combustion, from the basics to advanced concepts, making it suitable for both beginners and those looking for more in-depth knowledge.	

9"..Advanced Combustion Science". edited by Kefa Cen and Guoqiang Wang This compilation of chapters from various authors provides insights into cutting-edge combustion research, including advanced combustion modes and technologies. 10"..Introduction to Energy and the Environment". by John R. Fanchi and John J. Fanchi While not solely focused on combustion, this book offers a broader understanding of energy and its impact on the environment, including discussions on combustion-related issues.	
Internal Combustion Engine Fundamentals". by John Heywood While mainly focused on internal combustion engines, this book provides an excellent overview of combustion processes, thermodynamics, and engine performance	**المراجع الرئيسة (المصادر)**
"Introduction to Combustion" by Stephen R. Turns. This widely used textbook provides a comprehensive introduction to the principles of combustion, covering both the fundamentals and applications of combustion processes.	**الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)**
1.. American Institute of Chemical Engineers (AIChE). - Energy & Fuels Division: Website: [https://www.aiche.org/sbe/divisions/energy-fuels] (https://www.aiche.org/sbe/divisions/energy-fuels) AIChE provides resources, articles, and information about energy, fuels, and combustion from a chemical engineering perspective. 2.. Combustion Institute.: Website: [http://www.combustioninstitute.org/] (http://www.combustioninstitute.org/) The Combustion Institute is an international, non-profit, scientific and educational organization that promotes research and dissemination of combustion science. 3.. National Renewable Energy Laboratory (NREL).: Website: [https://www.nrel.gov/] (https://www.nrel.gov/) NREL offers research, data, and insights on renewable energy technologies, including combustion-related aspects of bioenergy and other sustainable energy sources. 4.. U.S. Department of Energy (DOE) - Energy Efficiency & Renewable Energy (EERE).: Website: [https://www.energy.gov/eere] (https://www.energy.gov/eere) The EERE division of the DOE focuses on energy efficiency and renewable energy technologies, including clean combustion and alternative fuels. 5.. American Society of Mechanical Engineers (ASME) - Combustion, Fuels, and Emissions Committee.:	**المراجع الإلكترونية، مواقع الانترنيت**

Website: [https://www.asme.org/codes-standards/committees/codes-and-standards/Combustion-Fuels-Emissions] (https://www.asme.org/codes-standards/committees/codes-and-standards/Combustion-Fuels-Emissions) ASME's committee addresses standards and research related to combustion, fuels, and emissions. 6.. Air & Waste Management Association (AWMA).: Website: [https://www.awma.org/] (https://www.awma.org/) AWMA focuses on environmental management and regulation, including air quality, emissions, and combustion-related pollution control. 7.. European Combustion Institute (ECI).: Website: [https://www.europeancombustionmeeting.org/] (https://www.europeancombustionmeeting.org/) ECI organizes events and provides resources for researchers and professionals in the field of combustion. 8.. International Flame Research Foundation (IFRF).: Website: [https://ifrf.net/] (https://ifrf.net/) IFRF focuses on combustion research, providing resources, publications, and knowledge-sharing platforms. 9.. United Nations Framework Convention on Climate Change (UNFCCC).: Website: [https://unfccc.int/] (https://unfccc.int/) UNFCCC addresses climate change and emissions reduction, offering insights into international efforts to mitigate the environmental impact of combustion processes.	

الآلات الكهربائي

نموذج وصف المقرر

١. اسم المقرر
الآلات الكهربائية
٢. رمز المقرر
Em En Emi 303604 (2+2
٣. الفصل / السنة
الفصل الاول ٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.م. عمر أحمد نعيم الآيميل :
٨. اهداف المقرر إيجازاً

اهداف المادة الدراسية	• **يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر الدراسي لمادة المكائن الكهربائية ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الأستفادة القصوى من فرص التعلم المتاحة.ولابدمن الربط بينها وبين وصف البرنامج.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	1	Introduction to AC Machine	محاضرات	مناقشة
٢	٣	١	Energy Conversion	محاضرات	مناقشة والتغذية الراجعة من الطالب
٣	٣	٢	AC winding design	محاضرات	اختبارات
٤-	٣	١ & ٢	Rotating Magnetic Field	محاضرات	اختبارات
٥	٣	١ & ٢	Magnetomotive Force (mmf) of AC Windings	محاضرات	اختبارات
٦	٣	١ & ٢	Synchronous Generators	محاضرات	مناقشة والتغذية الراجعة من الطالب
٧	٣	١ & ٢	Round Rotor Machines	محاضرات	مناقشة وتقارير
٨	٣	٣	Synchronous generator equivalent circuit	محاضرات	مناقشة
٩	٣	١&٢	Mid –term Exam		أختبارات
١٠	٣	٣	Synchronous Motors	محاضرات	مناقشة وتقارير
١١	٣	٣	Synchronous Motor equivalent circuit	محاضرات	مناقشة وتقارير
١٢	٣	٣	Induction generator	محاضرات	اختبارات
١٣	٣	٣	Induction Motors	محاضرات	اختبارات
١٤	٣	٣	Speed control of induction motor	محاضرات	

١٥	٣	٣	Induction Regulator	محاضرات	مناقشة والتغذية الراجعة من الطالب

١١. تقييم المقرر	
١. الاختبارات والامتحانات ٢. المناقشة ٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	
المراجع الرئيسة (المصادر)	Alternating Current Machines Pitman Pub,M.G.Say Theory of AC Machinery McGRAW-Hill Pub,A.S
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

اللغة الأنكليزيةIII

نموذج وصف المقرر

١٣. اسم المقرر	
اللغة الأنكليزية	
١٤. رمز المقرر	
Em En Ei 304917(2+0)	
١٥. الفصل / السنة	
الفصل الاول ٢٠٢٤-٢٠٢٥	
١٦. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
١٧. أشكال الحضور المتاحة	
اسبوعي	
١٨. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٣٠ ساعة	
١٩. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.م. رسل داود سلمان	الآيميل :
٢٠. اهداف المقرر	

اهداف المادة الدراسية	• تنمية مهارات القراءة والكتابة والتحدث والاستماع للغة الإنكليزية • تقديم دراسة نظرية شاملة عن كيفية تعلم الطالب وتطوير مهاراته. • استخدام الوسائل والأدوات الرقمية للمساهمة في تكوين وتفسير المعاني المطلوبة .

٢١. استراتيجيات التعليم والتعلم

الاستراتيجية	١. محاضرات وندوات ٢. طريقة التسجيلات الصوتية ٣. التقييم من أجل التعلم ٤. تعلم لغة المجتمع ٥. تعليم اللغة التواصلية

٢٢. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	2	1	Introductory Lecture	Lectures	Feedback
2	2	1	Speaking (paired choice) asking about the general opinions about possible issues	Lectures	Quizzes and Tests
3	2	1	Making conversations	Lectures	Feedback and Formative Assessment
4	2	3	Phrasal verbs	Lectures & discussions	Feedback and Formative Assessment
5	2	3	Listening to engineering conversations to obtain a wide vocabulary	Lectures & oral practicing	Observations
6	2	3	Correcting Mistakes	Lectures & Active Learning	Self-assessment
7	2	3	Mid-term Exam	Practicing Language	Peer Assessment
8	2	4	Writing (learning students how to write essays on the engineering field)		Examinations
9	2	4	Linking Words	Lecture and test	Peer Assessment
10	2	4	Everyday conversation	Inquiry-Based Learning	Portfolios
11	2	4	Auxiliary Verbs	Peer learning	Portfolios
12	2	6	Conjunctions	Reflective Learning & Experimental Learning	Assignments and Projects
13	2	6	Pronunciation	Reflective Learning & Experimental Learning	Assignments and Projects
14	2	6	Practice Language	Reflective Learning & Experimental Learning	Rubrics and Criteria-Based Assessments
15	2	6	Final Examination		Examinations

٢٣. تقييم المقرر	
١. الاختبارات والامتحانات ٢. المناقشة ٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة	
٢٤. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	▪ New Headway Plus intermediate ▪ The author: John & Liz Soars TOEFL Practice Online The official practice test that can help you go anywhere
المراجع الرئيسة (المصادر)	The Cambridge Encyclopedia of the English Language By David Crystal
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	Ciedupress.com/journal/index.php/wjel
المراجع الإلكترونية، مواقع الانترنيت	https://www.cambridge.org

تصميم اجزاء الالة

نموذج وصف المقرر

٢٥. اسم المقرر	
تصميم اجزاء الماكنة	
٢٦. رمز المقرر	
Em En Mdi 303503 (2+0)	
٢٧. الفصل / السنة	
الفصل الاول ٢٠٢٤-٢٠٢٥	
٢٨. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٢٩. أشكال الحضور المتاحة	
اسبوعي	
٣٠. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٣١. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. احمد وليد حسين	الآيميل :
٣٢. اهداف المقرر	

اهداف المادة الدراسية	• لتعريف الطالب التحليلات والحسابات اللازمة لتصميم الاجزاء الميكانيكية المختلفة والتي تكون تحت تاثير الاحمال الاستاتيكية او الديناميكية المختلفة.

٣٣. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

٣٤. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	1	مراجعة الاجهادات الاساسية	محاضرات	مناقشة
٢	٣	١	مراجعة الاجهادات المركبة ودائرة مور	محاضرات	مناقشة والتغذية الراجعة من الطالب
٣	٣	٢	انواع القوى وتصنيف المواد	محاضرات	اختبارات
٤-٥	٣	١ & ٢	فشل المواد المطيلية تحت احمال استاتيكية	محاضرات	اختبارات
٦	٣	١ & ٢	فشل المواد الهشة تحت احمال استاتيكية	محاضرات	اختبارات
٧-٨	٣	١ & ٢	الكلال وايجاد منحني N-S للمواد	محاضرات	مناقشة والتغذية الراجعة من الطالب
٩-١١	٣	١ & ٢	فشل الاجزاء الميكانيكية بالكلال	محاضرات	مناقشة وتقارير
١٢	٣	٣	تصميم المحاور تحت ضروف تحميل مختلفة	محاضرات	اختبارات
١٣	٣	٣	تصميم الخوابير تحت احمال مختلفة	محاضرات	اختبارات
١٤-١٥	٣	٣	تصميم وصلات اللحام تحت ضروف تحميل مختلفة	محاضرات	مناقشة والتغذية الراجعة من الطالب

٣٥. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

٣٦. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Mechanical Engineering Design, J. Shigley, Eight Edition,2008 Machine design: an Integrated approach, Norton,3rd edition, 2006
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

خزن الطاقة

نموذج وصف المقرر

١. اسم المقرر
خزن الطاقة
٢. رمز المقرر
Em En Wmi 304008 (2+0)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: أ.د. واثق ناصر حسين الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).**

	• المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	2	1 &2	Introduction to energy storage	محاضرات	مناقشة
٢	4	1&2	Thermal storage	محاضرات ومناقشة	مناقشة والتغذية الراجعة من الطالب
٣	4	1	Thermal storage	محاضرات ومناقشة	اختبارات
٤	4	3	Thermal storage	محاضرات	اختبارات
٥	4	3	Thermal storage	محاضرات ومناقشة	اختبارات
٦	4	3	Electrical storage	محاضرات	مناقشة والتغذية الراجعة من الطالب
٧	4	3	Electrical storage	محاضرات ومناقشة	مناقشة وتقارير
٨	4	4	Hydroelectric storage	محاضرات	اختبارات
٩	4	4	Mechanical storage	محاضرات	مناقشة
١٠	4	4	Mechanical storage	محاضرات	مناقشة والتغذية الراجعة من الطالب
١١	4	4	Bioenergy storage	محاضرات ومناقشة	اختبارات

١٢	4	6	Chemical energy storage	مناقشة	اختبارات
١٣	4	5&6	Chemical energy storage	محاضرات	اختبارات
١٤	4	6&7	Chemical energy storage	محاضرات	مناقشة والتغذية الراجعة من الطالب
	2	5,6 and 7	Final Examination		Examinations

١١. تقييم المقرر

. الاختبارات والامتحانات
٢. المناقشة
٣.واجب بيتي
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	1-Energy storage by Huggins R 2-Energy Production, Conversion, Storage, Conservation, and Coupling by Yasar Dimirel
المراجع الرئيسة (المصادر)	THERMAL ENERGYSTORAGE SYSTEMS AND APPLICATIONS, SECOND EDITION By Ibrahim Dincer
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

تصميم انظمة الالة

نموذج وصف المقرر

١. اسم المقرر
تصميم انظمة الالة
٢. رمز المقرر
Em En MDii 304311 (2+0)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي

٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.م. أحمد علي تومان الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• لتعريف الطالب التحليلات والحسابات اللازمة لتصميم الاجزاء الميكانيكية المختلفة والتي تكون تحت تاثير الاحمال الاستاتيكية او الديناميكية المختلفة.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١-٣	٣	1&2&3	تصميم وصلات البراغي تحت احمال مختلفة	محاضرات	مناقشة
٤-٦	٣	1&2&3	تصميم النوابض تحت احمال مختلفة	محاضرات	مناقشة والتغذية الراجعة من الطالب
٧-٨	٣	1&2&3	تصميم الاحزمة الناقلة تحت احمال مختلفة	محاضرات	اختبارات
٩	٣	1&2&3	المسننات وانواعها واستعمالاتها	محاضرات	اختبارات
١٠	٣	1&2&3	تصميم المسننات العدلة	محاضرات	اختبارات
١١	٣	1&2&3	تصميم المسننات المائلة	محاضرات	مناقشة والتغذية الراجعة من الطالب
١٢	٣	1&2&3	تصميم صناديق المسنان (نظام تعشيق)	محاضرات	مناقشة وتقارير
١٣-١٤	٣	1&2&3	تصميم المكابح	محاضرات	اختبارات
١٥	٣	1&2&3	Case study	محاضرات	اختبارات

١١. تقييم المقرر

١. الاختبارات والامتحانات

٢. المناقشة ٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Mechanical Engineering Design, J. Shigley, Eight Edition,2008 Machine design: an Integrated approach, Norton,3rd edition, 2006
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

محركات الاحتراق الداخلي IC

نموذج وصف المقرر

١. اسم المقرر	
محركات الاحتراق الداخلي	
٢. رمز المقرر	
Em In Icii 304513 (2+2)	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٦-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٣٠ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. فؤاد عبد الأمير خلف	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.**

	• اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٢	1	Introduction to IC engine and combustion Technology	Lectures	Quizzes and Tests
٢	٢	1	Classification of convention External and Internal engines	Lectures	Quizzes and Tests
٣	٢	1	Strokes in two and four stroke engine +main parts of IC engine	Lectures	Feedback and Formative Assessment
٤	٢	3	Air standard cycle Otto-cycle and Diesel-cycle	Lectures &Active Learning	Feedback and Formative Assessment
٥	٢	3	Air standard cycle Duel -cycle and Bryton cycle	Lectures &Active Learning	Observations

Self-Assessment	Lectures &Active Learning	Actual Cycle Engine & Working Principles	3	٢	٦
Peer Assessment	Flipped Classroom	Engine parameters + engine nomenclatures	3	٢	٧
Examinations	Flipped Classroom	Engine performance parameter I	4	٢	٨
Peer Assessment	Flipped Classroom	Engine performance parameter II	4	٢	٩
Portfolios	Inquiry-Based Learning	Engine with turbocharger performance	4	٢	١٠
Portfolios	Peer Learning	IC-Fuel and combustion Introduction	4	٢	١١
Assignments and Projects	Reflective Learning & Experimental Learning	Fuel types +fuel classification	6	٢	١٢
Assignments and Projects	Reflective Learning & Experimental Learning	Combustion stages ignition timing	6	٢	١٣
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Ic -Emissions and pollution	6	٢	١٤
Examinations		Final Examination	6	٢	
Quizzes and Tests	Lectures	Introduction to combustion Technology engine classification	1	٢	
Quizzes and Tests	Lectures	Air standard cycle +engine performance	1	٢	
Feedback and Formative Assessment	Lectures	Fuel types +combustion stages	1		

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع
٦. التقييم بين الأقران
٧. التقييم الذاتي واليوميات الانعكاسية
٨. ضمان الجودة الخارجي

١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Engineering Fundamentals of the Internal Combustion Engine" by Willard W. Pulkrabek. University of Wisconsin-·. Platteville IC Engines. Fourth Edition by V Ganesan. Professor Emeritus. Department of Mechanical Engineering. Indian Institute of Technology Madras Chennai.
المراجع الرئيسة (المصادر)	Fundamentals of internal combustion engine by gupta
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	https://testbook.com/question-answer/which-one-of-the-components-is-sometimes-called-l--5bff733e80df4a0c8d8d8734
المراجع الإلكترونية، مواقع الانترنيت	https://en.wikipedia.org/wiki/Internal_combustion_engine

منظومات القدرة الكهربائيةI

نموذج وصف المقرر

١. اسم المقرر	
منظومات القدرة الكهربائية I	
٢. رمز المقرر	
Em En Epi 303806 (2+0)	
٣. الفصل / السنة	
الفصل الاول|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: أ.م.د. علي صبري علو	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.

	• **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).** • **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. طريقة القاء المحاضرات. ٢. المجاميع الطلابية. ٣. ورش العمل. ٤. الرحلات العلمية لمتابعة الواقع العملي للشركات ذات العلاقة. ٥. التعلم الالكتروني داخل وخارج الحرم الجامعي. ٦. التعلم التجريبي

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	1	Electrical power generator	محاضرة	تغذية راجعة
٢	٣	1	Structure of electrical power system	محاضرة	تغذية راجعة
٣	٣	1	Location of power station	محاضرة	تغذية راجعة
٤	٣	3	Load curve and factors	محاضرة	امتحان
٥	٣	3	Power transmission	محاضرة	واجب
٦	٣	3	Conductor materials	محاضرة	تغذية راجعة
٧	٣	3	Parameter of overhead transmission line	محاضرة	تغذية راجعة
٨	٣	4	Mid-term Exam	محاضرة	امتحان فصلي
٩	٣	4	Mechanical design of transmission line	محاضرة	تغذية راجعة
١٠	٣	4	Distribution inside large building	محاضرة	تغذية راجعة
١١	٣	4	Constructor defiles of 33/11kV & 11/0.4 kV distribution systems	محاضرة	امتحان
١٢	٣	6	Emergency generators	محاضرة	تغذية راجعة
١٣	٣	6	Uniterrubtiptible power system (UPS)	محاضرة	واجب

١٤	٣	6	Reactive power control in distribution network	محاضرة	تغذية راجعة
١٥	٣	6	Distribution system configuration	محاضرة	تغذية راجعة

١١. تقييم المقرر

١- الامتحانات
٢- التقييم المستمر
٣- التقارير
٤- المحفزات
٥- التغذية الراجعة من الطلاب

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Electrical power systems. {A.E. Guile, W. Paterson} Volume one 2- Elements of power system analysis. {William D. Stevenson, SR.} 3- A course in electrical power. {M.L. Soni and P.V. Gupta }.
المراجع الرئيسة (المصادر)	
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

انتقال الكتلة و الحرارة
نموذج وصف المقرر

١. اسم المقرر
انتقال الحرارة والكتلة I
٢. رمز المقرر
Em En Hti 303501 (2+2)
٣. الفصل / السنة
الفصل الأول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٦-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د اوس عبد المحمود الآيميل :

٨. اهداف المقرر

اهداف المادة الدراسية	• تعريف الطالب باليات انتقال الحرارة وطرق حسابها • يقوم الطالب بتحليل واحتساب الاحمال الحرارية لمختلف التطبيقات الهندسية

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	١	Introduction heat transfer mechanisms	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٢	٣	١	Conduction heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٣	٣	٢&١	Introduction to convection heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٤	٣	٢&١	Examples	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٥	٣	٢&١	Thermal resistance networks	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٦	٣	٢&١	Exam		
٧	٣	٢&١	Introduction to radiation heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٨	٣	٢&١	Radiation heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٩	٣	٢&١	Two-Dimensional Heat transfer 1	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٠	٣	٢&١	Two-dimensional Heat transfer 2	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١١	٣	٢&١	Exam		

١٢	٣	٢&١	Unsteady heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٣	٣	٢&١	Heat transfer with heat generation	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٤	٣	٢&١	Exam		
١٥		٢	Review	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Fundamental of heat and mass transfer, Incropira, 7th Ed
المراجع الرئيسة (المصادر)	Heat Transfer a practical approach, Yunis A. Cengel 3rd Ed
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

منظومات القدرة الكهربائيةII

نموذج وصف المقرر

١٣. اسم المقرر
منظومات القدرة الكهربائية II
١٤. رمز المقرر
Em En Epii 304614 (2+0)
١٥. الفصل / السنة
الفصل االثاني|٢٠٢٤-٢٠٢٥
١٦. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
١٧. أشكال الحضور المتاحة
اسبوعي
١٨. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة

١٩. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)

الاسم: أ.م.د. علي صبري علو الآيميل :

٢٠. اهداف المقرر

اهداف المادة الدراسية

- **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.**
- **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.**
- **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).**
- **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.**
- **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.**
- **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.**
- **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٢١. استراتيجيات التعليم والتعلم

الاستراتيجية

١. طريقة القاء المحاضرات.
٢. المجاميع الطلابية.
٣. ورش العمل.
٤. الرحلات العلمية لمتابعة الواقع العملي للشركات ذات العلاقة.
٥. التعلم الالكتروني داخل وخارج الحرم الجامعي.
٦. التعلم التجريبي

٢٢. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	1	Electrical power generator	محاضرة	تغذية راجعة
٢	٣	1	Structure of electrical power system	محاضرة	تغذية راجعة
٣	٣	1	Location of power station	محاضرة	تغذية راجعة
٤	٣	3	Load curve and factors	محاضرة	امتحان
٥	٣	3	Power transmission	محاضرة	واجب
٦	٣	3	Conductor materials	محاضرة	تغذية راجعة
٧	٣	3	Parameter of overhead transmission line	محاضرة	تغذية راجعة
٨	٣	4	Mid-term Exam	محاضرة	امتحان فصلي

٩	٣	4	Mechanical design of transmission line	محاضرة	تغذية راجعة
١٠	٣	4	Distribution inside large building	محاضرة	تغذية راجعة
١١	٣	4	Constructor defiles of 33/11kV & 11/0.4 kV distribution systems	محاضرة	امتحان
١٢	٣	6	Emergency generators	محاضرة	تغذية راجعة
١٣	٣	6	Uniterrubtiptible power system (UPS)	محاضرة	واجب
١٤	٣	6	Reactive power control in distribution network	محاضرة	تغذية راجعة
١٥	٣	6	Distribution system configuration	محاضرة	تغذية راجعة

٢٣. تقييم المقرر

١- الامتحانات
٢- التقييم المستمر
٣- التقارير
٤- المحفزات
٥- التغذية الراجعة من الطلاب

٢٤. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Electrical power systems. {A.E. Guile, W. Paterson} Volume one 2- Elements of power system analysis. {William D. Stevenson, SR.} 3- A course in electrical power. {M.L. Soni and P.V. Gupta }.
المراجع الرئيسة (المصادر)	
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

انتقال الكتلة والحرارة II

نموذج وصف المقرر

١. اسم المقرر
انتقال الحرارة والكتلة II
٢. رمز المقرر
Em Ht Maii 304109 (2+2)
٣. الفصل / السنة

الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٦-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. اوس اكرم المحمود الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **تعريف الطالب باليات انتقال الحرارة وطرق حسابها** • **يقوم الطالب بتحليل واحتساب الاحمال الحرارية لمختلف التطبيقات الهندسية** • **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).** • **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم

١	٣	١	Introduction to convection heat transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٢	٣	١	Forced Convection Heat Transfer	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٣	٣	٢&١	Internal flow convection heat transfer +examples	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٤	٣	٢&١	External Flow heat transfer + examples	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٥	٣	٢&١	Natural convection	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٦	٣	٢&١	Exam		
٧	٣	٢&١	Heat Exchangers 1	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٨	٣	٢&١	Heat exchangers 2	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٩	٣	٢&١	Two-Dimensional Heat transfer 1	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٠	٣	٢&١	Two-dimensional Heat transfer 2	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١١	٣	٢&١	Exam		
١٢	٣	٢&١	Boiling and condensation	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٣	٣	٢&١	Cooling of electronic Equipment	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٤	٣	٢&١	Exam		
١٥		٢	Review	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Fundamental of heat and mass transfer, Incropira, 7th Ed
المراجع الرئيسة (المصادر)	Heat Transfer a practical approach, Yunis A. Cengel 3rd Ed
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

تحليلات هندسية

نموذج وصف المقرر

١. اسم المقرر	
تحليلات هندسية	
٢. رمز المقرر	
Em En Eai 303402 (2+0)	
٣. الفصل / السنة	
الفصل الاول|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: أ.م.د. بشار عبد حمزة	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).**

	• **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	٣	1	المعادلات التفاضلية من الدرجة الاولى	محاضرات	مناقشة
2	٣	1	المعادلات التفاضلية من الدرجة الاولى	محاضرات	مناقشة والتغذية الراجعة من الطالب
3	٣	1	المعادلات التفاضلية من الدرجة الاولى	محاضرات	مناقشة والتغذية الراجعة من الطالب
4	٣	١ & ٢	المعادلات التفاضلية من الدرجة الثانية ذات المعاملات الثابته	محاضرات	اختبارات
5	٣	١ & ٢	المعادلات التفاضلية من الدرجة الثانية ذات المعاملات الثابته	محاضرات	اختبارات
6	٣	١ & ٢	المعادلات التفاضلية من الدرجة الثانية ذات المعاملات الثابته	محاضرات	اختبارات
7	٣	١ & ٢	المعادلات التفاضلية المتسلسلة	محاضرات	اختبارات
8	٣	١ & ٢	المعادلات التفاضلية المتسلسلة	محاضرات	اختبارات
9	٣	1 to 3	متوالية فورير	محاضرات	مناقشة والتغذية الراجعة من الطالب

10	٣	1 to 3	متوالية فورير	محاضرات	مناقشة والتغذية الراجعة من الطالب
11	٣	1 to 3	متوالية فورير	محاضرات	اختبارات
12	٣	1 to 4	المعادلات التفاضلية الجزئية ومسائل قيم الحدود	محاضرات	اختبارات
13	٣	1 to 4	المعادلات التفاضلية الجزئية ومسائل قيم الحدود	محاضرات	مناقشة والتغذية الراجعة من الطالب
14	٣	1 to 4	المعادلات التفاضلية الجزئية ومسائل قيم الحدود	محاضرات	مناقشة والتغذية الراجعة من الطالب
15	٣	1 to 4	المعادلات التفاضلية الجزئية ومسائل قيم الحدود	محاضرات	مناقشة والتغذية الراجعة من الطالب

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. الواجب البيتي
٣. المناقشة
٤. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٥. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Advanced engineering mathematics, .C.RAY WYLIE. 5th edition, 1982
المراجع الرئيسة (المصادر)	Advanced engineering mathematics, .Kreyszig, 2006
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

تحليلات عددية

نموذج وصف المقرر

١٣. اسم المقرر
تحليلات عددية
١٤. رمز المقرر
Em En Naii 304210 (2+0)
١٥. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥

١٦. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
١٧. أشكال الحضور المتاحة
اسبوعي
١٨. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
١٩. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. قيس حاتم محمد الآيميل :
٢٠. اهداف المقرر

اهداف المادة الدراسية	**يهدف مقرر التحليل العددي إلى تعليم الطلاب كيفية تصميم وتحليل وتطبيق خوارزميات للحصول على حلول عددية تقريبية ودقيقة في الوقت نفسه للمسائل الرياضية المعقدة التي يستحيل حلها تحليليًا. تشمل الأهداف الرئيسية فهم تحليل الأخطاء (التقريب/القطع)، والاستقرار العددي، وكفاءة الخوارزميات، وتطبيق هذه التقنيات على الجبر الخطي، وإيجاد الجذور، والاستيفاء، والمعادلات التفاضلية.** **إتقان المواضيع الأساسية: اكتساب الكفاءة في التقنيات العددية الرئيسية، بما في ذلك:** • **إيجاد الجذور: طريقة نيوتن-رافسون المعدلة.** • **الجبر الخطي: تحليل LU، حذف غاوس، القيم الذاتية.** • **الاستيفاء/التقريب (ملاءمة المنحنى): استيفاء كثيرات الحدود، طريقة المربعات الصغرى.** • **الحساب العددي: التفاضل والتكامل (التربيع).** • **المعادلات التفاضلية العادية (ODE) من نوع مسائل القيمة الابتدائية (IVP): طرق أويلر، طريقة أويلر المعدلة، طريقة رونج-كوتا.** • **المعادلات التفاضلية العادية (ODE) من نوع مسائل القيمة الحدية (BVP): الفروق المحدودة: الصيغة القياسية، والصيغة القطرية.** • **المعادلات التفاضلية الجزئية (PDE) من نوعي القطع الناقص والقطع المكافئ: مع أمثلة على معادلات لابلاس وبواسون للقطع الناقص، ومعادلة توصيل الحرارة في اتجاه واحد للقطع المكافئ.**

٢١. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات. ٢. المجاميع الطلابية. ٣. ورش العمل. ٤. التعلّم الإلكتروني داخل وخارج الحرم الجامعي. ٥. التعلّم التجريبي.

٢٢. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	4	1,2,3,4,5	Root-finding	1,2,4,5	1,2,3,5
٢	4	1,2,3,4,5	Linear Algebra	1,2,4,5	1,2,3,5
٣	4	1,2,3,4,5	Approximation (Curve fit)	1,2,3,5	1,2,3,4,5
٥	4	1,2,3,4,5	Interpolation	1,3,4,5	1,2,3,5
٥	4	1,2,3,4,5	Interpolation	1,2,3,5	1,2,3,5
٦	4	1,2,3,4,5	Differentiation	1,3,4,5	1,2,3,4,5
٧	4	1,2,3,4,5	Integration	1,2,4,5	1,2,3,5

٨	4	1,2,3,4,5	ODE (IVP)	1,2,3,5	1,2,3,5
٩	4	1,2,3,4,5	ODE (IVP)	1,3,4,5	1,2,3,4,5
١٠	4	1,2,3,4,5	ODE (BVP)	1,2,4,5	1,2,3,5
١١	4	1,2,3,4,5	ODE (BVP)	1,2,3,5	1,2,3,4,5
١٢	4	Monthly exam	Monthly exam	Monthly exam	Monthly exam
١٣	4	1,2,3,4,5	Laplace and Poisson equation	1,2,4,5	1,2,3,4,5
١٤	4	1,2,3,4,5	Conduction Heat equation	1,2,3,5	1,2,3,5
١٥	4	Mid exam	Mid exam	Mid exam	Mid exam

٢٣. تقييم المقرر

١- الامتحانات
٢- التقييم المستمر
٣- التقارير
٤- التحفيز
٥- ملاحظات الطلاب

٢٤. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	ساستري، إس. إس.، ٢٠١٢. طرق تمهيدية للتحليل العددي. شركة بي إتش آي للتعليم المحدودة.
المراجع الرئيسة (المصادر)	• ساور، ت.، ٢٠١٢، التحليل العددي، الطبعة الثانية، بيرسون للتعليم. • ريتشارد ل. بيردن، ج. دوغلاس فيرز، أنيت م. بيردن، ٢٠١٦، التحليل العددي، الطبعة العاشرة، سينجايج للتعليم.
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	١- ٣Blue1Brown، الجبر الخطي، https://www.3blue1brown.com/ ٢- الجبر، https://www.whyu.org/ ٣- الرياضيات التطبيقية، https://www.youtube.com/@zachstar ٤- الطرق العددية المبسطة - دورة كاملة (الجزء الأول)، https://www.youtube.com/@StudySessionYT ٥- LibreTexts MATHAMATICS، https://math.libretexts.org/
المراجع الإلكترونية، مواقع الانترنيت	ساستري، إس. إس.، ٢٠١٢. طرق تمهيدية للتحليل العددي. شركة بي إتش آي للتعليم المحدودة.

ادارة المخلفات واسترداد الطاقة

نموذج وصف المقرر

١. اسم المقرر
ادارة المخلفات واسترداد الطاقة

٢. رمز المقرر	
Em En Wmi 303907 (2+0)ا	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٣٠ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: أ.د. واثق ناصر حسين	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.
٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. التعلم التجريبي/ التعلم الخبري
١٠. بنية المقرر	

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	2	1 &2	introduction	محاضرات	مناقشة
٢	٢	1&2	Types and Composition of Solid Wastes	محاضرات ومناقشة	مناقشة والتغذية الراجعة من الطالب
٣	٢	1	=	محاضرات ومناقشة	اختبارات
٤	٢	3	Composition of solid wastes and their determination	محاضرات	اختبارات
٥	٢	3	Composition of solid wastes and their determination	محاضرات ومناقشة	اختبارات
٦	٢	3	Separation, processing and transformation of solid waste	محاضرات	مناقشة والتغذية الراجعة من الطالب
٧	٢	3	Separation, processing and transformation of solid waste+1st exam	محاضرات ومناقشة	مناقشة وتقارير
٨	٢	4	SANITARY AND BIOREACTOR LANDFILLS	محاضرات	اختبارات
٩	٢	4	SANITARY AND BIOREACTOR LANDFILLS	محاضرات	مناقشة
١٠	٢	4	Biogas Characteristics	محاضرات	مناقشة والتغذية الراجعة من الطالب
١١	٢	4	Biogas characteristic	محاضرات ومناقشة	اختبارات
١٢	2	6	Energy recovery comparision	مناقشة	اختبارات
١٣	2	5&6	Energy waste in firing system	محاضرات	اختبارات
١٤	2	6	Energy waste in firing system	محاضرات	مناقشة والتغذية الراجعة من الطالب
	2	5,6	Final Examination		Examinations

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣.واجب بيتي

٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	1.Waste Management by Er Sunil Kumar 2 .Solid Waste Management; LECTURE NOTES 3 .Solid wastes Problem and Benefits by Watheq N. Hussein
المراجع الرئيسة (المصادر)	1.Energy Production, Conversion, Storage, Conservation, and Coupling by Yasar Dimirel 2 .Solid wastes Problem and Benefits by Wateq N. Hussein solid Waste Management; LECTURE NOTES
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

الطاقة الشمسية

نموذج وصف المقرر

١. اسم المقرر	
الطاقة الشمسية	
٢. رمز المقرر	
Em In Seii 304412 (1+2)	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: **م.د. علي جابر عبد الحميد**	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.**

	• اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. طريقة القاء المحاضرات. ٢. المجاميع الطلابية. ٣. ورش العمل. ٤. الرحلات العلمية لمتابعة الواقع العملي للشركات ذات العلاقة. ٥. التعلم الالكتروني داخل وخارج الحرم الجامعي. ٦. التعلم التجريبي

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	1	Solar radiation & solar time	محاضرة	تغذية راجعة
٢	٣	1	Solar angle	محاضرة	تغذية راجعة
٣	٣	1	Radiation on Horizontal and inclined plane	محاضرة	تغذية راجعة
٤	٣	3	Design of solar systems, Flat plate collector (FPC)	محاضرة	امتحان
٥	٣	3	Parabolic trough collector (PTC)	محاضرة	واجب
٦	٣	3	Receiver tube in PTC	محاضرة	تغذية راجعة
٧	٣	3	Geometry analysis of PTC	محاضرة	تغذية راجعة
٨	٣	4	Mid-term Exam	محاضرة	امتحان فصلي
٩	٣	4	Photovoltaic Panels PV	محاضرة	تغذية راجعة
١٠	٣	4	Design of PV array	محاضرة	تغذية راجعة
١١	٣	4	Basics of wind energy conversion	محاضرة	امتحان
١٢	٣	6	Design of wind generator system,	محاضرة	تغذية راجعة

		Aerodynamics of wind turbines			
١٣	٣	Rotor design	6	محاضرة	واجب
١٤	٣	Measurement of wind	6	محاضرة	تغذية راجعة
١٥	٣	Wind electric generators	6	محاضرة	تغذية راجعة

١١. تقييم المقرر

١. الامتحانات
٢. التقييم المستمر
٣. التقارير
٤. المحفزات
٥. التغذية الراجعة من الطلاب

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	
المراجع الرئيسة (المصادر)	Solar Engineering of Thermal Processes, Photovoltaic and Wind
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	http://ndl.ethernet.edu.et/bitstream/123456789/87792/1/A.Duffie%205th%20edition_compressed.pdf

النانو تكنلوجي والمواد النانوية

نموذج وصف المقرر

١. اسم المقرر
النانو تكنولوجي والمواد النانوية
٢. رمز المقرر
Em En Nnii 304715 (2+0)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٣٠ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: أ.م.د. وسام جليل خضير الآيميل :

٨. اهداف المقرر

اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٢	1	مقدمة عن تكنلوجيا النانو	محاضرات	مناقشة
٣-٢	٢	3, 4, and 6	تصنيف المواد النانوية	محاضرات	مناقشة والتغذية الراجعة من الطالب
٥-٤	٢	2	ترسيب الاغشية الرقيقة	محاضرات	اختبارات
٧-٦	٢	1 and 2	تصنيع المواد النانوية بطرق الترسيب الفيزيائي للأبخرة	محاضرات	اختبارات
٩-٨	٢	1 and 2	تصنيع المواد النانوية بطرق الترسيب الكيمياوي للأبخرة	محاضرات	اختبارات
١٠-١١	٢	1-4, and 6	انابيب الكاربون النانوية	محاضرات	مناقشة والتغذية الراجعة من الطالب
١٢-١٣	٢	1-4, and 6	طرق فحص المواد النانوية ١	محاضرات	مناقشة تفاعلية

١٤-١٥	٢	1-4, and 6	طرق فحص المواد النانوية ٢	محاضرات	تقارير وعروض

١١. تقييم المقرر
١. الاختبارات والامتحانات ٢. المناقشة ٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة
١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	1.Handouts from different references 2.Introduction to Nanoscale Science and Technology", Edited by Massimiliano Di Ventra, Stephane Evoy, and James R. Heflin, Jr. (Springer, 2004), ISBN: 1-4020-7720-3
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

طاقة الهيدروجين وخلايا الوقود

نموذج وصف المقرر

١. اسم المقرر
طاقة الهيدروجين وتكنلوجيا خلايا الوقود
٢. رمز المقرر
Em En Heii 304816 (1+2)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٧٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: أ.م.د. وسام جليل خضير الآيميل :

٨. اهداف المقرر

اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. ورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير ٧. اجراء التجارب العملية في المختبر

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٥	1	مقدمة عن طاقة الهيدروجين وتكنلوجيا خلايا الوقود	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة تفاعلية
٢	٥	2, 4, and 6	مبادئ الهندسة الكهروكيميائية ١	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة والتغذية الراجعة من الطالب
٣	٥	٢	مبادئ الهندسة الكهروكيميائية ٢	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	اختبارات
٤	٥	2, 4, and 6	ثرموداينمك خلايا الوقود ١	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة والتغذية الراجعة من الطالب
٥	٥	٢	ثرموداينمك خلايا الوقود ٢	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	اختبارات
٦	٥	2, 4, and 6	حركيات التفاعل في خلايا الوقود ١	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة والتغذية الراجعة من الطالب

٧	٥	٢	حركيات التفاعل في خلايا الوقود ٢	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	اختبارات
٨	٥	٢	حركيات التفاعل في خلايا الوقود ٣	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة تفاعلية
٩	3	2, 4, and 6	ظواهر الانتقال في انظمة خلايا الوقود ١	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	اختبارات
١٠	2	٢	ظواهر الانتقال في انظمة خلايا الوقود ٢	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة تفاعلية
١١	2	3, 4, and 6	تقييم خلايا الوقود	محاضرات (٢ نظري+١ مناقشة+ ٢ عملي)	مناقشة وتقارير
١٢	2	3, 4, and 6	تطبيقات خلايا الوقود	محاضرات (٢ نظري+١ مناقشة)	مناقشة وتقارير
١٣	2	٣	خلية الوقود البوليميرية	محاضرات (٢ نظري+١ مناقشة)	اختبارات
١٤	2	١	خزن, انتاج, ونقل الهيدروجين	محاضرات (٢ نظري+١ مناقشة)	اختبارات
١٥	2	٧	تصميم خلايا الوقود	محاضرات (٢ نظري+١ مناقشة)	مناقشة وتقارير

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Fuel Cell Engines", Matthew M. Mench, 2008 " .by John Wiley & Sons, Inc
المراجع الرئيسة (المصادر)	Fuel Cell Handbook (http://www.seca.doe.gov/tutorial/pdf/FCHandbook6.pdf)
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

المرحلة الرابعة/ ٢٠٢٥

أنظمة السيطرة

نموذج وصف المقرر

١. اسم المقرر

أنظمة السيطرة
٢. رمز المقرر
Em En Csii 405709 (3+0)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.حامد حسين هدوان الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).** • **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١-طريقة القاء المحاضرات. ٢- استراتيجية التفكير الناقد في التعلم ٣- استراتيجية التفكير العالية ٤- استراتيجية العصف الذهني ٥- المجاميع الطلابية ٦- ورش العمل ٧- الرحلات العلمية لمتابعة الواقع العملي لطبيعة عمل أنظمة السيطرة في الطاقة ٨-التعلم الالكتروني داخل الحرم الجامعي

	٩-التعلم التجريبي

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
	٣	5%	المقدمة: التعاريف والمفاهيم للتحكم الذاتي، تصنيف أنظمة التحكم	طريقة القاء المحاضرات	١- الامتحانات
٢	٣	5%	أنظمة التحكم المفتوح والمغلق، مفاهيم التغذية الراجعة، متطلبات أنظمة التحكم المثالي	استراتيجية التفكير الناقد في التعلم	٢- التقييم المستمر
٣	٣	5%	النمذجة الرياضية، الدالة الإنتقالية، نمذجة الأنظمة الميكانيكية، الأنظمة الكهربائية، الأنظمة الالكتروميكانيكية، الأنظمة الحرارية، الأنظمة الهيدروليكية، الأنظمة الهوائية، الأنظمة التماثلية: قوة فولتية، قوة تيار	المحاضرات	الأختبارات
٤	٣	5%	الرسوم التخطيطيّة ورسوم التدفق البيانية البارزة: تمثيل رسم تخطيطي، وظيفية الكتل، تخفيض رسم تخطيطي، رسوم تدفق بيانية بارزة، وصيغة مكسبِ ميسن.	استراتيجية العصف الذهني	٤- المحفزات
٥	٣	7%	تحليل الإستجابة المستقرةِ العابرِ والثابتِ: المقدمة، مساهمات إختبارِ قياسيةِ، مفهوم الوقتِ الثابتةِ وأهميتِه في سرعةِ الرَدّ، تحليل الطلبِ الأولِ وأنظمةِ الطلبِ الثانيةِ، مواصفات رَدِّ عابرةِ، تحليل إستقرارِ نظامِ – معيار راوث	المجاميع الطلابية	٥- التغذية الراجعة من الطلاب
٦	٣	8%	تحليلِ استجابة الترددِ بإستخدام مخططات نايكوست ، مخططات القطبية	ورش العمل	مناقشة
٧	٣	8%	معيارية استقرارية نايكوست، تحليل الإستقرارية، الإستقرارية النسبية، حافة الإكتساب والطور، دوائر M&N	الرحلات العلمية لمتابعة الواقع العملي لطبيعة عمل أنظمة السيطرة في الطاقة	مناقشة والتغذية الراجعة من الطالب
٨	٣	8%	تحليلِ استجابة الترددِ بإستخدام مخططات بود، بود تخطيطاتَ التخفيفِ، بود إستعمال تحليلِ الإستقرارِ المؤامراتَ، وبسّطَ بود التخطيطاتَ، هامش المكسبَ والمرحلةَ	٨-التعلم الالكتروني داخل الحرم الجامعي	المحاضرات
٩	٣	7%	مخططات مكانِ المحال الهندسية: تعريف جذرِ المحال الهندسية، يَحْكُمُ جنرالُ لصالح بناء جذرِ المحال الهندسية، تحليلِ مخططات مكانِ المحال الهندسية.	٩-التعلم التجريبي	المهام والمشاريع
١٠	٣	7%	عمل سيطرةِ وتعويضِ نظامِ: أنواع أجهزةِ السيطرة -اشتقاق نسبي تكاملي نسبي تكاملي نسبي	محاضرات	الأختبارات
١١	٣	7%	أجهزة السيطرة القابلة للإشتقاق التكاملية النسبية (مفهوم أساسي فقط)، تعويض التعليقاتَ والسلسلةَ، أدوات طبيعية لتعويضِ النظامِ.	محاضرات	مناقشة وتقارير
١٢	٣	7%	المقدمة والتمثيل الرياضي مِنْ تأريخِ رجال آليين، أنواع الرجال الآليين وترقيمِ وموقعِ وتوجيه جسم صلب	التعلم المعكوس	تقييم الأقران
١٣	٣	7%	بَعْض خصائص مصفوفاتِ الدورانِ، دورات متعاقبة، يَصِيدُ أويلر إطارات ثابتة X Y Z وإطار مؤثّر ZYZ. تحويل بين النظامِ المنسّقِ، نظراء متجانس	استراتيجية التفكير العالية	تقارير
١٤	٣	7%	خصائص A BT، أنواع المفاصلِ: المفصل الكروي المشترك الإسطواني المشترك الموشوري الدوّار، تمثيل الصلاتِ التي تَستعملُ بارامتراتَ دينقت: بارامترات وصلةِ لمتوسّطةِ، أولاً وأخيراً صلات، مصفوفات تحويلِ وصلةِ	محاضرات	الملاحظات

١٥	٣	7%	مصفوفات تحويلِ 3R معالج، معالج PUMA560، معالج SCARA	محاضرات	مناقشة

١١. تقييم المقرر
١-الامتحانات ٢-التقييم المستمر ٣-التقارير ٤-المحفزات ٥-التغذية الراجعة من الطلاب

١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	1 -Control Engineering, Uday A. Bakshi and Varsha U. Bakshi. 2 -Control Engineering, D. Ganesh Rao and K. Channa Venkatesh.
المراجع الرئيسة (المصادر)	Feedback and Control Systems, Joseph J. Distefano, Allen R. Stubberud and Ivan J. Williams
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	1. Modern Control Engineering, Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., New Delhi
المراجع الإلكترونية، مواقع الانترنيت	2 .Control Systems Principles and Design, M. Gopal, Tata McGraw Hill Publishing Co. Ltd., New Delhi

هندسة الطاقة الحيوية

نموذج وصف المقرر

١. اسم المقرر
هندسة الطاقة الحيوية
٢. رمز المقرر
Em In Bei 405406 (1+2)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
٤-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)

٤٥ ساعة

٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)

الاسم: م.م. ضي سعدي ناجي الآيميل :

٨. اهداف المقرر

اهداف المادة الدراسية

- **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.**
- **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.**
- **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).**
- **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.**
- **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.**
- **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.**
- **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية

١. المحاضرات والندوات
٢. التعلم القائم على حل المشكلات (PBL)
٣. التعلم القائم على المشروع (PrBL)
٤. ورش العمل والتمارين العملية
٥. التدريب التعاوني والتدريب على العمل
٦. التعلم الإلكتروني والتعلم المدمج
٧. تقييم للتعلم
٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	3	1	Some basic concepts and definitions	Lectures	Quizzes and Tests
2	3	2	Biomass types, advantages and drawbacks, characteristics	Lectures	Quizzes and Tests
3	3	2	Biomass types, advantages and drawbacks, characteristics	Lectures	Feedback and Formative Assessment

Feedback and Formative Assessment	Lectures & Active Learning	Classification and assessment of biofuels	3	3	4
Observations	Lectures & Active Learning	Classification and assessment of biofuels	3	3	5
Self-assessment	Lectures & Active Learning	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	6
Peer Assessment	Flipped Classroom	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	7
Examinations	Flipped Classroom	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	8
Peer Assessment	Flipped Classroom	Complete, partial, and perfect biofuel combustion	4.5	3	9
Portfolios	Inquiry-Based Learning	Complete, partial, and perfect biofuel combustion	4.5	3	10
Portfolios	Lectures & Active Learning	Pyrolysis - Types – process Typical yield rates.	5	3	11
Assignments and Projects	Lectures & Active Learning	Pyrolysis - Types – process Typical yield rates.	5	3	12
Assignments and Projects	Lectures & Active Learning	Types, comparisons, applications, performance and economics of gasification	6	3	13
Rubrics and Criteria-Based Assessments	Lectures & Active Learning	Types, comparisons, applications, performance and economics of gasification	6	3	14
Assignments and Projects	Lectures & Active Learning	Revision and project	7	3	15

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع

٦. التقييم بين الأقران	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Nelson, V. C., Starcher, K. L. (2017). Introduction to Bioenergy. United Kingdom: CRC Press.
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

محطات توليد القدرهII

نموذج وصف المقرر

١. اسم المقرر	
محطات الطاقة II	
٢. رمز المقرر	
Em En Ppii 406113 (1+2)	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٦-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د.فؤاد عبدالأمير خلف	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **دراسة المحطات المركبة.** • **دراسة الأنواع الرئيسي للتوربينات البخارية.** • **دراسة المحطات الكهرومائية.**
٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية

٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير	

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	١	Introduction to combined cycle power plant	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٢	٣	١	Introduction to steam turbine	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٣	٣	٢&١	Classification of steam turbine .	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٤	٣	٢&١	Steam turbine compounding system	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٥	٣	٢&١	Velocity diagram of simple impulse steam turbine	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٦	٣	٢&١	Exam		
٧	٣	٢&١	Reaction turbine	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٨	٣	٢&١	Velocity diagram of reaction turbine	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٩	٣	٢&١	Reheat factor	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٠	٣	٢&١	Hydroelectric power plant .	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١١	٣	٢&١	Classification of hydroelectric turbine	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٢	٣	٢&١	Velocity diagram	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٣	٣	٢&١	Geothermal power plants	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٤	٣	٢&١	Exam		

١٥		٢	Review	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية

١١. تقييم المقرر	
١. الاختبارات والامتحانات ٢. المناقشة ٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح ٤. التغذية الراجعة من الطلبة	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	• مبادئ ديناميك الحرارة المؤلف ماثيور شارما" • هندسة محطات توليد القدرة المؤلف PK.Nag
المراجع الرئيسة (المصادر)	• مواقع الإنترنت
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

الهندسة الصناعية

نموذج وصف المقرر

١. اسم المقرر
الهندسة الصناعية
٢. رمز المقرر
Em En Ieii 405911 (2+0)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
٢٣-٥-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٣٠ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. أحمد رياض راضي الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• تمكين الطالب من تعلم مواضيع مختلفة في الهندسة الصناعية

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١-طريقة القاء المحاضرات. ٢- استراتيجية التفكير الناقد في التعلم ٣- استراتيجية التفكير العالية ٤- استراتيجية العصف الذهني ٥- المجاميع الطلابية ٦- ورش العمل ٧- الرحلات العلمية لمتابعة الواقع العملي لطبيعة عمل أنظمة السيطرة في الطاقة ٨-التعلم الالكتروني داخل الحرم الجامعي ٩-التعلم التجريبي

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٢	5%	Introduction To Industrial Engineering	محاضرة نظري	مناقشة
٢	٢	5%	Benefit Study	محاضرة نظري	مناقشة والتغذية الراجعة من الطالب
٣	٢	5%	Plant Layout	محاضرة نظري	أختبارات
٤	٢	5%	Networks	محاضرة نظري	واجب
٥	٢	7%	Work And Time Study	محاضرة نظري	تقارير
٦	٢	8%	Linear Programming		أختبارات
٧	٢	8%	Transportation Problems	محاضرة نظري	مناقشة والتغذية الراجعة من الطالب
٨	٢	8%	Production Cost Control	محاضرة نظري	أمتحان فصلي
٩	٢	7%	Depreciation	محاضرة نظري	تغذية لراجعة
١٠	٢	7%	Total Quality Management (TQM)	محاضرة نظري	مناقشة
١١	٢	7%	Quality Control	محاضرة نظري	مناقشة والتغذية الراجعة من الطالب
١٢	٢	7%	Numerical Methods of Quality Control	محاضرة نظري	مناقشة وتقارير
١٣	٢	7%	Pareto Chart	محاضرة نظري	التقييم الذاتي
١٤	٢	7%	Exam		أختبارات
١٥	٢	7%	Review	محاضرة نظري	تقييم

١١. تقييم المقرر

١-الامتحانات ٢-التقييم المستمر ٣-التقارير ٤-المحفزات ٥-التغذية الراجعة من الطلاب	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Industrial Engineering
المراجع الرئيسة (المصادر)	Operation Research by Hamdy Taha
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

أدارة و أقتصاد الطاقة

نموذج وصف المقرر

١٣. اسم المقرر	
أدارة وأقتصاد الطاقة	
١٤. رمز المقرر	
Em En Eei 405002 (2+0)	
١٥. الفصل / السنة	
الفصل الاول|٢٠٢٤-٢٠٢٥	
١٦. تاريخ إعداد هذا الوصف	
٢٣-٥-٢٠٢٣	
١٧. أشكال الحضور المتاحة	
اسبوعي	
١٨. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٣٠ساعة	
١٩. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. احمد رياض راضي	الآيميل :
٢٠. اهداف المقرر	
اهداف المادة الدراسية	• **يتعرف الطالب اساسيات ادارة الطاقة والاقتصاد من حيث خصائصها ودراسة سلوكها إكساب الطالب المهارة العلمية والعملية اللازمة لمعرفة طرق واساليب احدث التقنيات الخاصة بأدارة الطاقة والاقتصاد والتي تمكنه من اداء عمله الهندسي في المعامل ومحطات توليد الطاقة وشركات توليد وتجهيز الطاقة ومؤسسات القطاع العام والخاص**
٢١. استراتيجيات التعليم والتعلم	
الاستراتيجية	١-طريقة القاء المحاضرات.

٢- استراتيجية التفكير الناقد في التعلم ٣- استراتيجية التفكير العالية ٤- استراتيجية العصف الذهني ٥- المجاميع الطلابية ٦- ورش العمل ٧- الرحلات العلمية لمتابعة الواقع العملي لطبيعة عمل أنظمة السيطرة في الطاقة ٨-التعلم الالكتروني داخل الحرم الجامعي ٩-التعلم التجريبي	

٢٢. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٢	5%	مبادئ ادارة الطاقة	محاضرة نظري	تغذية راجعة
٢	٢	5%	تدقيق الطاقة وادارة اقتصاد التوزيع	محاضرة نظري	تغذية راجعة
٣	٢	5%	فرص المحافظة على الطاقة	محاضرة نظري	تغذية راجعة
٤	٢	5%	المشروع الهندسي ودورة حياة المشروع واسباب فشلها	محاضرة نظري	أمتحان
٥	٢	7%	الادارة المالية	محاضرة نظري	واجب
٦	٢	8%	مراقبة وسيطرة الكلف	محاضرة نظري	تغذية راجعة
٧	٢	8%	الربح وهامش المساهمة	محاضرة نظري	تغذية راجعة
٨	٢	8%	مبادئ وقياسات الاقتصاد الهندسي	محاضرة نظري	تغذية راجعة
٩	٢	7%	العوامل الاقتصادية المهمة	محاضرة نظري	واجب
١٠	٢	7%	Midterm Exam	محاضرة نظري	أمتحان فصلي
١١	٢	7%	تحليل الشبكات	محاضرة نظري	تغذية راجعة
١٢	٢	7%	الهندسة الخطية	محاضرة نظري	أختبار
١٣	٢	7%	هياكل المنظمات	محاضرة نظري	تغذية راجعة
١٤	٢	7%	الايزو ٥٠٠٠١	محاضرة نظري	تغذية راجعة
١٥	٢	7%	أدارة الموارد البشرية	محاضرة نظري	تغذية راجعة

٢٣. تقييم المقرر

١-الامتحانات
٢-التقييم المستمر
٣-التقارير
٤-المحفزات
٥-التغذية الراجعة من الطلاب

٢٤. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	* Kanoğlu, M., & Çengel, Y. A. (2020). Energy efficiency and management for engineers. McGraw-Hill Education.

* Capehart, B. L., Turner, W. C., & Kennedy, W. J. (2020). Guide to energy management. River Publishers. * Oung, K. (2016). Energy management in business: the manager's guide to maximising and sustaining energy reduction. Routled	
* Doty, S., & Turner, W. C. (2004). Energy management handbook. Crc Press. * Operation Research, Hamdy Ta.	**المراجع الرئيسة (المصادر)**
	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)
	المراجع الإلكترونية، مواقع الانترنيت

الأجهزة في أنظمة الطاقة

نموذج وصف المقرر

١. اسم المقرر
الأجهزة في أنظمة الطاقة
٢. رمز المقرر
Em En Iei 404901 (2+2)
٣. الفصل / السنة
الفصل الأول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د أحمد وليد حسين الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **تنمية مهارات القراءة والكتابة والتحدث والاستماع للغة الإنكليزية.** • **تقديم دراسة نظرية شاملة عن كيفية تعلم الطالب وتطوير مهاراته.** • **تقديم لمحة عامه عن مختلف القضايا المهمة الخاصة باللغة الإنكليزية التي تساعد الطالب على التواصل بسهوله مع الاخرين.** • **تطبيق الجوانب النظرية وذلك بالسماح للطالب بممارسة اللغة وتشجيعه على التحدث مع الأجانب.** • • **اكساب الطلبة القدرة على التعبير عن آرائهم والمشاركة في النقاشات** • **استخدام الوسائل والأدوات الرقمية للمساهمة في تكوين وتفسير المعاني المطلوبة.**

٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. محاضرات وندوات ٢. طريقة التسجيلات الصوتية ٣. التقييم من أجل التعلم ٤. تعلم لغة المجتمع ٥. تعليم اللغة التواصلية

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم

Feedback	Lectures	Characteristics of measuring devices: Classifications of measuring devices	5%	3	1
Quizzes and Tests	Lectures	Characteristics of static and kinetic measuring devices	5%	3	2
Feedback and Formative Assessment	Lectures	Experimental error analysis - systematic and random	5%	3	3
Feedback and Formative Assessment	Lectures & discussions	Statistical analysis – inaccuracy	5%	3	4
Observations	Lectures & oral practicing	Experimental planning and selection of measuring instruments	7%	3	5
Self-assessment	Lectures & Active Learning	Reliability on devices	8%	3	6
Peer Assessment	Practicing Language	Unit Two: Measures of natural quantities: Thermometer - natural properties	8%	3	7
Examinations		Temperature measuring devices	8%	3	8
Peer Assessment	Lecture and test	Pressure and flow measuring devices	7%	3	9
Portfolios	Inquiry-Based Learning	Unit Three: - Advancing metrics techniques: tangent graphing	7%	3	10
Portfolios	Peer learning	Internal magnetic forces	7%	3	11
Assignments and Projects	Reflective Learning & Experimental Learning	Schileren	7%	3	12
Assignments and Projects	Reflective Learning & Experimental Learning	Accelerometer Laser Doppler	7%	3	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Hot wire speed meter	7%	3	14
Examinations		Standards Telemetry	7%	3	15

١١. تقييم المقرر

١- الامتحانات
٢- التقييم المستمر
٣- التقارير

٤- المحفزات ٥- ملاحظات الطلاب	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Engineering Metrology, R. K. Jain, Khanna Publishers, 1994. Mechanical Measurements, Beckwith Marangoni and Lienhard, Pearson Education, 6th Ed., 2006.
المراجع الرئيسة (المصادر)	1. Engineering Metrology, IC Gupta, Dhapat Rai Publications, Delhi. 2. Mechanical Measurements, R. K. Jain 3. Industrial Instrumentation, Alsutko, Jerry. D. Faulk, Thompson Asia Pvt. Ltd.2002.
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	Mechanical Measurements, Beckwith Marangoni and Lienhard, Pearson Education, 6th Ed., 2006.
المراجع الإلكترونية، مواقع الانترنيت	1- Control Systems Principles and Design, M. Gopal, Tata McGraw Hill Publishing Co. Ltd., New Delhi Copyright Year: 2020, dissidents. 2- https://archive.nptel.ac.in/courses/112/106/112106139/

محطات توليد القدرةI

نموذج وصف المقرر

١. اسم المقرر	
محطات الطاقة I	
٢. رمز المقرر	
Em En Ppi 405305 (2+0)	
٣. الفصل / السنة	
الفصل الأول٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٦-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. فؤاد عبد الأمير خلف	الآيميل :
٨. اهداف المقرر	

اهداف المادة الدراسية	• دراسة أنواع محطات توليد القدره. • دراسة المحطات الحرارية بشكل تفصيلي. • دراسة المحطات الغازية.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٣	١	Introduction steam power plants	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٢	٣	١	Type of cycles	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٣	٣	٢&١	Improving the efficiency of steam power plants	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٤	٣	٢&١	Open feed water heater	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٥	٣	٢&١	Close feed water heater	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٦	٣	٢&١	Exam		
٧	٣	٢&١	Regenerative cycles	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٨	٣	٢&١	Condensers	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
٩	٣	٢&١	Boilers	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٠	٣	٢&١	Method of improving boilers performance	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١١	٣	٢&١	Pumps	محاضرة نظري	

١٢	٣	٢&١	Examples	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٣	٣	٢&١	Valves	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية
١٤	٣	٢&١	Exam		
١٥		٢	Review	محاضرة نظري	امتحانات اسبوعية –اسئلة قبلية وبعدية

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	• مبادئ الأحتراق المؤلف ماثيور شارما • مبادئ ديناميك الحرارة المؤلف يونس • هندسة المحطات PK.Nag
المراجع الرئيسة (المصادر)	• مواقع الإنترنت
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

تصميم أنظمة الطاقة المتجددة I

نموذج وصف المقرر

١. اسم المقرر
تصميم أنظمة الطاقة المتجددة I
٢. رمز المقرر
Em En Dri 405204 (2+0)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. علي محمد مقداد الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **القدرة على وضع أساس لتصميم وتطوير أنظمة الطاقة المستدامة.** • **فهم بناء وتشغيل واستخدام الألواح الشمسية المركزة والمجمعات.** • **إظهار فهم قوي للنمذجة الرياضية لأنظمة الطاقة.** • **للتعرف على كيفه عمل نظام المياه بالطاقة الشمسية ويستخدم الطاقة الإضافية للزيادة الاداء.** • **تعلم كيفية اختيار وتصميم نظام طاقة مناسب لتطبيق ما.** • **فهم كيف يمكن تطبيق نظام الطاقة الهجين لتحقيق أهداف متعددة.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والمناقشة ٢. التعلم القائم على حل المشكلات ٣. التعلم القائم على المشروع (مجاميع طلابية) ٤. الندوات وورش العمل والزيارات العلمية ٥. التعليم الإلكتروني والتعلم المدمج ٦. التقارير

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	3	1	مقدمة في أنظمة الطاقة	محاضرات	مناقشة

2-3	6	2	تصميم وتشغيل مجمعات الطاقة الشمسية	محاضرات	مناقشة والتغذية الراجعة من الطالب
4-6	9	3-4	نظام تسخين المياه بالطاقة الشمسية	محاضرات	اختبارات
7-8	6	5	نظام الطاقة المساعدة، نظام الأنابيب	محاضرات	اختبارات
9-10	6	4	التحكم في درجة الحرارة وقياسها	محاضرات	اختبارات
11-12	6	5	نظام تخزين الطاقة	محاضرات	مناقشة والتغذية الراجعة من الطالب
13-14	6	6	نظام الطاقة الحرارية الأرضية، نظام تسخين الفضاء الشمسي	محاضرات	مناقشة وتقارير
15	3	6	المراجعة والمشروع	محاضرات	اختبارات

١١. تقييم المقرر

١. الاختبارات والامتحانات
٢. المناقشة
٣. العروض الشفوية والدفاع عن التقارير او المشروع المقترح
٤. التغذية الراجعة من الطلبة

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Salameh, Z. (2014). Renewable energy system design. Academic press.
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

الهندسة النووية

نموذج وصف المقرر

١. اسم المقرر
الهندسة النووية
٢. رمز المقرر
Em En Nei 405507 (2+0)
٣. الفصل / السنة
الفصل الاول|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٦-٢٠٢٣

٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د مهند جابر ياسر الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	3	1	Atomic and nuclear physics	Lectures	Quizzes and Tests
٢	3	1	Mass and energy	Lectures	Quizzes and Tests
٣	3	1	Binding energy	Lectures	Feedback and

Formative Assessment					
Feedback and Formative Assessment	Lectures &Active Learning	Interaction of radiation wit matter	3	٣	٤
Observations	Lectures &Active Learning	Neutron attenuation	3	٣	٥
Self-Assessment	Lectures &Active Learning	Problem set_1	3	٣	٦
Peer Assessment	Flipped Classroom	Neutron diffusion and moderation	3	٣	٧
Examinations	Flipped Classroom	The equation of continuity	4	٣	٨
Peer Assessment	Flipped Classroom	Diffusion length	4	٣	٩
Portfolios	Inquiry-Based Learning	Problem set_2	4	٣	١٠
Portfolios	Peer Learning	Nuclear reactor theory	4	٣	١١
Assignments and Projects	Reflective Learning & Experimental Learning	Reactor geometries	6	٣	١٢
Assignments and Projects	Reflective Learning & Experimental Learning	One-group critical equation	6	٣	١٣
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Thermal reactors	6	٣	١٤
Examinations		Final Examination	6	٣	

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع
٦. التقييم بين الأقران
٧. التقييم الذاتي واليوميات الانعكاسية

٨. ضمان الجودة الخارجي	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition. Nuclear Engineering Handbook, Frank Kreith & Roop Mahajan - Series Editors.
المراجع الرئيسة (المصادر)	Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition.
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	Introduction to Nuclear Engineering - UNSW Handbook
المراجع الإلكترونية، مواقع الانترنيت	https://www.amazon.com/Introduction-Nuclear-Engineering-John-Lamarsh/dp/0201824981

الطاقة والبيئة

نموذج وصف المقرر

١. اسم المقرر	
الطاقة والبيئة	
٢. رمز المقرر	
Em En Eeii 405810 (2+2)	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
١-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٣٠ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م. مهند جابر ياسر	الآيميل :
٨. اهداف المقرر	

اهداف المادة الدراسية	• تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة. • اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن. • تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001). • المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم. • الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح. • التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة. • المساهمة الفاعلة في نشاطات خدمة المجتمع.

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	2	1	Introduction to environmental pollution	Lectures	Quizzes and Tests
٢	2	1	Material balance and energy fundamentals	Lectures	Quizzes and Tests
٣	2	2	Classification of pollution	Lectures	Quizzes and Tests
٤	2	3	Air pollution and control methods	Lectures	Quizzes and Tests
٥	2	3	Sources and effects of air pollutants	Lectures	Quizzes and Tests
٦	2	3	Sampling measurement and	Lectures	Quizzes and Tests

		analysis of air pollutants			
Quizzes and Tests	Lectures	Solid waste management: sources and classification	3	2	٧
Examinations	Lectures	Solid waste disposal options	4	2	٨
Quizzes and Tests	Lectures	Toxic waste management	4	2	٩
Quizzes and Tests	Lectures	Water pollution: sources of water pollutants	4	2	١٠
Quizzes and Tests	Lectures	Classification and effects of water pollutants	4	2	١١
Quizzes and Tests	Lectures	Water pollution laws and standards	6	2	١٢
Quizzes and Tests	Lectures	Environment for comfort living and working	6	2	١٣
Quizzes and Tests	Lectures	Natural and artificial lightning	6	2	١٤
Examinations	Lectures	Noise pollution	6	2	15

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع
٦. التقييم بين الأقران
٧. التقييم الذاتي واليوميات الانعكاسية
٨. ضمان الجودة الخارجي

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Gilbert M. Masters, Introduction to Environmental Engineering and Science, Third edition, 2014
المراجع الرئيسة (المصادر)	Lee C. C., Environmental Engineering Dictionary, Fourth Edition, 2005
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	Lawrence, K. Wang, Handbook of Environmental Engineering, 2004

المراجع الإلكترونية، مواقع الانترنيت	https://sciencedirect.com

تصميم أنظمة الطاقة المتجددة II

نموذج وصف المقرر

١. اسم المقرر	
تصميم أنظمة الطاقة المتجددة II	
٢. رمز المقرر	
Em In Drii 406012 (2+0)	
٣. الفصل / السنة	
الفصل الثاني|٢٠٢٤-٢٠٢٥	
٤. تاريخ إعداد هذا الوصف	
٤-٩-٢٠٢٣	
٥. أشكال الحضور المتاحة	
اسبوعي	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
٤٥ ساعة	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. علي محمد مقداد	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).** • **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**
٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات والندوات

	٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	3	1	Thermal modeling	Lectures	Quizzes and Tests
2	3	2	Thermal modeling	Lectures	Quizzes and Tests
3	3	1.2	Solar space heating system	Lectures	Feedback and Formative Assessment
4	3	3,4	Solar space heating system	Lectures & Active Learning	Feedback and Formative Assessment
5	3	3.4	Solar space heating system	Lectures & Active Learning	Observations
6	3	1.5	Solar distillation system	Lectures & Active Learning	Self-assessment
7	3	1.5	Solar distillation system	Flipped Classroom	Peer Assessment
8	3	3	PV solar cell	Flipped Classroom	Examinations
9	3	3	PV solar cell	Flipped Classroom	Peer Assessment
10	3	4	PV system	Inquiry-Based Learning	Portfolios
11	3	4	PV system	Lectures & Active Learning	Portfolios
12	3	5	Battery thermal management systems	Lectures & Active Learning	Assignments and Projects

13	3	5	Battery thermal management systems	Lectures & Active Learning	Assignments and Projects
14	3	6	Solar dryer system	Lectures & Active Learning	Rubrics and Criteria-Based Assessments
15	3	7	Revision and project	Lectures & Active Learning	Assignments and Projects

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع
٦. التقييم بين الأقران
٧. التقييم الذاتي واليوميات الانعكاسية
٨. ضمان الجودة الخارجي

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	Salameh, Z. (2014). Renewable energy system design. Academic press.
المراجع الرئيسة (المصادر)	Handouts from different references
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

هندسة طاقة الرياح

نموذج وصف المقرر

١. اسم المقرر
هندسة طاقة الرياح
٢. رمز المقرر
Em En Weii 406214 (1+2)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
٤-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)

٣٠ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.د. فؤاد عبد الأمير خلف الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **دراسة طاقة الرياح.** • **دراسة الأنواع الرئيسية لتوربينات الرياح.** • **دراسة محطات الرياح وتصميم توربين الرياح.** • **دراسة ديناميك الهواء.**

٩. استراتيجيات التعليم والتعلم

الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل ٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	2	1	ntroduction to wind energy	Lectures	Quizzes and Tests
2	2	2	Introduction to wind turbine	Lectures	Quizzes and Tests
3	2	2	Classification of wind turbine .	Lectures	Feedback and Formative Assessment
4	2	3	Wind turbine control system	Lectures & Active Learning	Feedback and Formative Assessment
5	2	3	Wind farm type	Lectures & Active Learning	Observations
6	2	4	Wind power station type	Lectures & Active Learning	Self-assessment
7	2	4	Wind energy conservation system	Flipped Classroom	Peer Assessment

Examinations	Flipped Classroom	Horizontal and vertical wind turbine	4	2	8
Peer Assessment	Flipped Classroom	Wind turbine components	4	2	9
Portfolios	Inquiry-Based Learning	Wind turbine propeller design	5	2	10
Portfolios	Lectures & Active Learning	Velocity diagram	5	2	11
Assignments and Projects	Lectures & Active Learning	Aerodynamics, boundary layer, Airfoil	5	2	12
Assignments and Projects	Lectures & Active Learning	Aerodynamics, boundary layer, Airfoil	5.6	2	13
Rubrics and Criteria-Based Assessments	Lectures & Active Learning	ntroduction to wind energy	6	2	14
Assignments and Projects	Lectures & Active Learning	Exame	7	2	15

١١. تقييم المقرر

١. التقويم المستمر
٢. الامتحانات
٣. التقييمات العملية
٤. تقييم المشاريع
٥. العروض الشفوية والدفاع
٦. التقييم بين الأقران
٧. التقييم الذاتي واليوميات الانعكاسية
٨. ضمان الجودة الخارجي

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	• مبادئ التوربينات الهوائية , المؤلف ماثيور شارما تصميم طاقة الرياح , المؤلف Thomas Corke
المراجع الرئيسة (المصادر)	• مواقع الإنترنت
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

نموذج وصف المقرر

١. اسم المقرر
الكترونيك القدرة
٢. رمز المقرر
Em En Pei 405103 (2+2)
٣. الفصل / السنة
الفصل الأول |٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٧٥ ساعة
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م.م. احمد محمد مرزة الآيميل :
٨. اهداف المقرر

اهداف المادة الدراسية	• **تعليم وتدريب الطلاب للحصول على شهادة جامعية بكالوريوس علوم هندسة في تخصص هندسة الطاقة والطاقات المتجددة.** • **اعداد مهندسين اكفاء في مجال هندسة الطاقة والطاقات المتجددة تتحقق فيهم متطلبات محصلات الخريجين التي تضمنتها المعايير التخصصية المحلية (المعايير الوطنية للاعتماد الهندسي) والعالمية (معايير ABET) وكذلك متطلبات اصحاب الشأن.** • **تطبيق معايير جودة التعليم في اعداد المناهج وباقي متطلبات العملية التعليمية الاخرى وذلك من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير العالمية التخصصية ومعايير المختبر التعليمي الجيد (GLP) والمعايير الوطنية للمختبرات ومعرفة وأدراك معايير المواصفات المهنية (نظام ادارة السلامة والصحة المهنية ISO 45001 ونظام ادارة البيئة ISO 14001 ونظام ادارة الطاقة ISO 50001).** • **المساهمة الفاعلة في تطوير منظومة الادارة الهندسية والقدرات العلمية في مجال التصميم، التصنيع، والسيطرة النوعية من خلال انتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **الاشتراك في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية للمعامل التصنيعية والقدرة على إدراك ضرورة مواصلة التنمية الذاتية للمعرفة المهنية وكيفية ايجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في كل جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفاعلة في نشاطات خدمة المجتمع.**

٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات والندوات ٢. التعلم القائم على حل المشكلات (PBL) ٣. التعلم القائم على المشروع (PrBL) ٤. ورش العمل والتمارين العملية ٥. التدريب التعاوني والتدريب على العمل

٦. التعلم الإلكتروني والتعلم المدمج ٧. تقييم للتعلم ٨. التعلم التجريبي/ التعلم الخبري	

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	5	1	Introduction to Power Electronics	Lectures	Quizzes and Tests
٢	5	1	Classification of electronics switching and their uses	Lectures	Quizzes and Tests
٣	5	1	Single phase Half wave rectifier (Uncontrolled)	Lectures	Feedback and Formative Assessment
٤	5	3	Single phase Half wave rectifier (Controlled)	Lectures &Active Learning	Feedback and Formative Assessment
٥	5	3	Single phase Full wave rectifier (Uncontrolled)	Lectures &Active Learning	Observations
٦	5	3	Single phase Full wave rectifier (Controlled)	Lectures &Active Learning	Self-Assessment
٧	5	3	Three phase half wave rectifier	Flipped Classroom	Peer Assessment
٨	5	4	Three phase full wave rectifier	Flipped Classroom	Examinations
٩	5	4	DC DC/Converters	Flipped Classroom	Peer Assessment
١٠	5	4	Buck Converter	Inquiry-Based Learning	Portfolios
١١	5	4	Boost Converters	Peer Learning	Portfolios
١٢	5	6	Introduction to Inverters	Reflective Learning & Experimental Learning	Assignments and Projects
١٣	5	6	Single Phase inverters	Reflective Learning &	Assignments and Projects

	Experimental Learning				
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Three Phase inverters	6	5	١٤
Examinations		Final Examination	6	5	15

١١. تقييم المقرر	
١. التقويم المستمر ٢. الامتحانات ٣. التقييمات العملية ٤. تقييم المشاريع ٥. العروض الشفوية والدفاع ٦. التقييم بين الأقران ٧. التقييم الذاتي واليوميات الانعكاسية ٨. ضمان الجودة الخارجي	
١٢. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	Power Electronics, Daniel W. Hart
المراجع الرئيسة (المصادر)	Power Electronics, Rasheed Mohan
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	
المراجع الإلكترونية، مواقع الانترنيت	

نمذجة ومحاكاة نظام الطاقة

نموذج وصف المقرر

١. اسم المقرر
نمذجة ومحاكاة نظام الطاقة
٢. رمز المقرر
Em En Msii 406315 (2+0)
٣. الفصل / السنة
الفصل الثاني|٢٠٢٤-٢٠٢٥
٤. تاريخ إعداد هذا الوصف
١-٦-٢٠٢٣
٥. أشكال الحضور المتاحة
اسبوعي
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٤٥ ساعات

٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: م.د. صباح عودة عبد الامير	الآيميل :
٨. اهداف المقرر	
اهداف المادة الدراسية	• **تدريس وتدريب الطلاب للحصول على درجة البكالوريوس في العلوم الهندسية في هندسة الطاقة والطاقات المتجددة.** • **إعداد مهندسين مؤهلين في مجال هندسة الطاقة والطاقات المتجددة يستوفون متطلبات مخرجات الخريجين المدرجة في المعايير المحلية المتخصصة (المعايير الوطنية للاعتماد الهندسي) والدولية (معايير ABET) وكذلك متطلبات أصحاب المصلحة.** • **تطبيق معايير جودة التعليم في إعداد المناهج وبقية متطلبات العملية التعليمية الأخرى من خلال تطبيق المعايير الوطنية للاعتماد الهندسي والمعايير الدولية المتخصصة ومعايير جودة المختبرات التعليمية (GLP) ومعايير المختبرات الوطنية والمعرفة والوعي بالمعايير المهنية (نظام إدارة السلامة والصحة المهنية ISO 45001 , نظام إدارة البيئة ISO 14001 ونظام إدارة الطاقة ISO 50001).** • **المساهمة الفعالة في تطوير منظومة الإدارة الهندسية والقدرات العلمية في مجال التصميم والتصنيع ومراقبة الجودة من خلال إنتاج البحوث العلمية ومشاريع التخرج في مجال تخصص القسم.** • **المشاركة في نشر الوعي الهندسي وإقامة الدورات العلمية والزيارات الميدانية لمختبرات التصنيع والقدرة على إدراك الحاجة إلى مواصلة التطوير الذاتي للمعرفة المهنية وكيفية إيجادها وتقييمها وجمعها وتطبيقها بشكل صحيح.** • **التحسين المستمر في جميع جوانب البرنامج التعليمي للقسم ويتم ذلك من خلال تطبيق مبدأ التقييم الذاتي والاستفادة من التغذية الراجعة.** • **المساهمة الفعالة في أنشطة خدمة المجتمع.**
٩. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. المحاضرات: يمكن أن توفر محاضرات الفصول الدراسية التقليدية مقدمة منظمة للمفاهيم والنظريات والمنهجيات الأساسية. يمكن استكمال المحاضرات بعروض الوسائط المتعددة والرسوم البيانية وأمثلة من العالم الحقيقي لتعزيز الفهم. ٢. دراسات الحالة: يمكن أن يساعد تحليل دراسات الحالة لأنظمة الطاقة الحقيقية الطلاب على تطبيق المعرفة النظرية على السيناريوهات العملية. يمكن أن تؤدي مناقشة التحديات التي تمت مواجهتها والحلول المنفذة في هذه الحالات إلى تعميق الفهم. ٣. ورش العمل العملية: تنظيم ورش عمل عملية حيث يمكن للطلاب العمل مع برامج المحاكاة (على سبيل المثال، MATLAB وPython وأدوات محاكاة الطاقة المتخصصة) لإنشاء نماذج وتحليل أنظمة الطاقة. ٤. المتحدثون الضيوف: قم بدعوة المتحدثين الضيوف من صناعة الطاقة أو الأوساط الأكاديمية لتبادل خبراتهم وتجاربهم في العالم الحقيقي. يمكن أن يوفر ذلك للطلاب نظرة ثاقبة حول ممارسات الصناعة والاتجاهات الحالية. ٥. مناقشات المجموعة: إشراك الطلاب في مناقشات جماعية لاستكشاف الموضوعات بمزيد من التعمق. شجعهم على تحليل أنظمة الطاقة بشكل نقدي، ومناقشة الإيجابيات والسلبيات، واقتراح الحلول. ٦. العروض التفاعلية: استخدم العروض التوضيحية أو التجارب التفاعلية لعرض مبادئ نظام الطاقة، مثل كيفية عمل مصادر الطاقة المختلفة أو سلوك أنظمة تخزين الطاقة.

٧. جلسات حل المشكلات: إجراء جلسات حيث يعمل الطلاب من خلال مشاكل نظام الطاقة المعقدة كمجموعة أو بشكل فردي. هذا يشجع التفكير النقدي وتطبيق المفاهيم.

٨. الموارد عبر الإنترنت: استخدم الموارد عبر الإنترنت مثل مقاطع الفيديو والبودكاست والمحاكاة التفاعلية لتكملة طرق التدريس التقليدية. يمكن أن تلبي الموارد عبر الإنترنت أساليب التعلم المختلفة.

١. دراسة مستقلة: شجع الطلاب على قراءة الكتب المدرسية والأوراق البحثية والمقالات ذات الصلة. هذا يعزز التعلم الموجه ذاتيا والمشاركة الأعمق مع الموضوع.

٢. تمارين عملية: تعيين تمارين المحاكاة ومهام البرمجة للسماح للطلاب بتطبيق المفاهيم النظرية عمليا. هذا يبني المهارات في النمذجة والتحليل.

٣. مشاريع المجموعة: قم بتعيين مشاريع جماعية حيث يتعاون الطلاب لإنشاء نماذج شاملة لنظام الطاقة. هذا يساعدهم على تطوير مهارات العمل الجماعي وتطبيق المعرفة على سيناريوهات العالم الحقيقي.

٤. التعلم من الأقران: تنظيم جلسات مراجعة الأقران حيث يقدم الطلاب ملاحظات حول مشاريع أو نماذج أو عروض تقديمية لبعضهم البعض. هذا يشجع التقييم النقدي ومهارات الاتصال.

٥. التعلم القائم على حل المشكلات: تقديم تحديات الطاقة في العالم الحقيقي للطلاب وتوجيههم للبحث والتحليل واقتراح الحلول. هذا النهج يعزز مهارات حل المشكلات.

٦. العروض: قم بتعيين موضوعات أو دراسات حالة للطلاب واطلب منهم تقديم نتائجهم إلى الفصل. هذا يعزز مهارات الاتصال ويعمق الفهم من خلال التعلم من الأقران.

٧. المحاكاة التفاعلية: دمج المحاكاة التفاعلية والمختبرات الافتراضية للسماح للطلاب بتجربة نماذج نظام الطاقة ومراقبة سلوكهم.

٨. الرحلات الميدانية والزيارات الميدانية: إذا كان ذلك ممكنا، قم بتنظيم زيارات إلى مرافق توليد الطاقة أو مواقع التخزين أو مراكز التوزيع. وهذا يوفر سياقا واقعيا ويعزز التعلم التجريبي.

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
١	٢	١	**الوحدة ١: مقدمة في أنظمة الطاقة والنمذجة** • نظرة عامة على أنظمة الطاقة ومكوناتها • مصادر الطاقة وخصائصها • أهمية النمذجة والمحاكاة في تحليل الطاقة	المحاضرات	الاختبارات القصيرة والاختبارات

٢	٢	١	**الوحدة ٢: الأدوات الرياضية والحسابية** • المعادلات التفاضلية ودورها في نمذجة نظام الطاقة • الطرق العددية لحل المعادلات التفاضلية • مقدمة في تقنيات التحسين في أنظمة الطاقة • لغات البرمجة وأدوات محاكاة نظام الطاقة	المحاضرات	الاختبارات القصيرة والاختبارات
٣	٢	١	**الوحدة ٣: نمذجة تقنيات توليد الطاقة** • نمذجة مصادر الطاقة المتجددة (الطاقة الشمسية، طاقة الرياح، الطاقة المائية، إلخ) • نمذجة مصادر الطاقة التقليدية (الوقود الأحفوري والنووي) • دراسات حالة لتكنولوجيات توليد الطاقة	المحاضرات	التغذية الراجعة والتقييم التكويني
٤	٢	٣	**الوحدة ٤: نمذجة تحويل الطاقة وتخزينها** • النمذجة الديناميكية الحرارية لعمليات تحويل الطاقة • نمذجة أنظمة تخزين الطاقة (البطاريات، التخزين الحراري، إلخ) • السلوك الديناميكي والتحليل العابر لأنظمة تخزين الطاقة	المحاضرات والتعلم النشط	التغذية الراجعة والتقييم التكويني
٥	٢	٣	**الوحدة ٥: توزيع الطاقة وتكاملها** • نمذجة أنظمة نقل وتوزيع الطاقة • تكامل مصادر وتقنيات الطاقة المتعددة • استراتيجيات التحكم لتشغيل نظام الطاقة بكفاءة	المحاضرات والتعلم النشط	الملاحظات
٦	٢	٣	**الوحدة ٦: التحليل البيئي والاقتصادي** • تقييم دورة حياة أنظمة الطاقة (LCA) • النمذجة الاقتصادية وتحليل التكاليف • اعتبارات الاستدامة وتقييم الأثر البيئي	المحاضرات والتعلم النشط	التقييم الذاتي
٧	٢	٣	**الوحدة ٧: المحاكاة الديناميكية والتحليل العابر** • المحاكاة الديناميكية لأنظمة الطاقة • تحليل عابر لسلوك النظام • دراسات حالة لاستجابة النظام للظروف المتغيرة	الفصول الدراسية المقلوبة	تقييم الأقران
٨	٢	٤	**الوحدة ٨: الموضوعات المتقدمة والاتجاهات الناشئة**	الفصول الدراسية المقلوبة	الفحوص

		• النمذجة العشوائية وتحليل عدم اليقين • تقنيات التحقق من صحة النموذج والتحقق منه • التحسين متعدد الأهداف في تصميم نظام الطاقة • الاتجاهات الناشئة في نمذجة الطاقة ومحاكاتها			
٩	٢	**الوحدة ٩: دراسات الحالة والتطبيقات في العالم الحقيقي** • تحليل متعمق لدراسات حالة نظام الطاقة الحقيقي • محاكاة تكامل الشبكة لمصادر الطاقة المتجددة • نمذجة نظام الطاقة لتحليل السياسات وصنع القرار	٤	الفصول الدراسية المقلوبة	تقييم الأقران
١٠	٢	**الوحدة ١٠: مشاريع الطلاب والتمارين العملية** • تمارين محاكاة عملية باستخدام البرامج ذات الصلة • مشاريع نمذجة نظام الطاقة على نطاق صغير ذات صلة بالعالم الحقيقي • عرض ومناقشة المشاريع الطلابية	٤	التعلم القائم على الاستقصاء	المحافظ
١١	٢	**الوحدة ١١: مهارات الاتصال والعرض** • التواصل الفعال لنتائج المحاكاة والنتائج • مهارات العرض لنقل المعلومات التقنية المعقدة	٤	التعلم من الأقران	المحافظ
١٢	٢	**الوحدة ١٢: المراجعة والتقييم النهائي** • مراجعة المفاهيم والمنهجيات الرئيسية التي تغطيها الدورة • التحضير للتقييم النهائي (عروض المشروع، الامتحانات، إلخ.)	٦	التعلم التأملي والتعلم التجريبي	المهام والمشاريع
١٣	٢	• الواجبات والاختبارات القصيرة طوال الدورة (٢٠٪) • تمارين عملية ومهام محاكاة (١٥٪) • الامتحان النصفي (٢٠٪) • المشاريع الجماعية والعروض التقديمية (٢٥٪) • المشاركة في الفصل ومهارات الاتصال (١٠٪) • المشروع النهائي والعرض التقديمي (١٠٪)	٦	التعلم التأملي والتعلم التجريبي	المهام والمشاريع

١٤	٢	٦	الامتحان النهائي		الفحوص

١١. تقييم المقرر

تعد طرق التقييم ضرورية لتقييم فهم الطلاب ومهاراتهم وتقدمهم في الدورة التدريبية. بالنسبة لدورة حول "نمذجة ومحاكاة أنظمة الطاقة"، يمكن أن يوفر مزيج من طرق التقييم رؤية شاملة لقدرات الطلاب. فيما يلي بعض طرق التقييم التي يمكن استخدامها:

.١ الواجبات والاختبارات:
- يمكن للواجبات والاختبارات المنتظمة تقييم فهم الطلاب للمفاهيم النظرية والأسس الرياضية.
- إسناد مهام البرمجة المتعلقة بنمذجة نظام الطاقة لتقييم المهارات العملية.
- يمكن استخدام الاختبارات لاختبار مواضيع محددة يتم تناولها في المحاضرات أو القراءات.

.٢ تمارين عملية:
- تعيين تمارين محاكاة حيث يقوم الطلاب بإنشاء نماذج نظام الطاقة وتحليل سلوكهم باستخدام برامج المحاكاة.
- تقييم دقة نماذجها، ومدى ملاءمة عمليات المحاكاة الخاصة بها، وقدرتها على تفسير النتائج.

.٣ الفحوص:
- يمكن للامتحان النصفي و / أو النهائي تقييم فهم الطلاب للمفاهيم والنظريات والمبادئ الأساسية التي يغطيها المقرر الدراسي.
- تصميم الأسئلة التي تتطلب التفكير النقدي ومهارات حل المشكلات بدلا من مجرد الحفظ.

.٤ مشاريع المجموعة:
- تعيين مشاريع جماعية حيث يعمل الطلاب معا لتطوير نماذج شاملة لنظام الطاقة بناء على سيناريوهات العالم الحقيقي.
- تقييم قدرتها على دمج المكونات المختلفة، وتحسين أداء النظام، وتقديم النتائج التي توصلوا إليها.

.٥ العروض:
- اطلب من الطلاب تقديم نتائج المحاكاة الخاصة بهم أو نتائج المشاريع أو تحليلات دراسات الحالة إلى الفصل.
- تقييم مهارات الاتصال لديهم، والقدرة على شرح المفاهيم المعقدة، وقدرتهم على تقديم البيانات بشكل فعال.

.٦ المشاركة الصفية:
- تقييم مشاركة الطلاب في المناقشات الصفية وورش العمل وجلسات مراجعة الأقران.
- يمكن أن تظهر المشاركة النشطة تفهمهم واستعدادهم للتعامل مع الموضوع.

.٧ المشروع النهائي:
- تصميم مشروع نهائي شامل يتطلب من الطلاب تطبيق معرفتهم بنمذجة نظام الطاقة لحل مشكلة معقدة.
- تقييم قدرتهم على إنشاء نماذج دقيقة وتحليل السيناريوهات وتقديم نتائج ذات مغزى.

.٨ مراجعة الأقران:
- دمج تقييم الأقران في المشاريع الجماعية، حيث يقدم الطلاب ملاحظات حول عمل بعضهم البعض.
- هذا يمكن أن يشجع التقييم النقدي ويعزز مهارات التعاون والتواصل.

.٩ التقارير المكتوبة:
- مطالبة الطلاب بتقديم تقارير مكتوبة عن الواجبات أو المشاريع أو المحاكاة.
- تقييم قدرتهم على نقل تحليلاتهم ونتائجهم واستنتاجاتهم بوضوح ودقة.

.١٠ الاختبارات أو المناقشات عبر الإنترنت:
- استخدام المنصات عبر الإنترنت لإجراء الاختبارات أو المناقشات لتسهيل التقييم المستمر.
- يمكن أن توفر هذه المنصات ملاحظات فورية وتشجع المشاركة المستمرة.

.١١ الامتحانات العملية:
- إجراء اختبارات عملية حيث يظهر الطلاب قدرتهم على إنشاء وتشغيل عمليات المحاكاة في الوقت الفعلي.
- تقييم كفاءتهم في استخدام برامج المحاكاة وتطبيق تقنيات النمذجة.

١٢. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	١.." مقدمة في نمذجة وتحليل الأنظمة المعقدة" بقلم هيروكي سايامًا. - يقدم هذا الكتاب مقدمة عامة لنمذجة الأنظمة المعقدة، بما في ذلك أنظمة الطاقة، ويغطي تقنيات ومناهج النمذجة المختلفة.

	٢.." هندسة أنظمة الطاقة: التقييم والتنفيذ" بقلم فرانسيس فانيك ولويس أولبرايت ولارجوس أنجيننت. - يقدم نظرة عامة شاملة على أنظمة الطاقة، بما في ذلك النمذجة والتحليل والتنفيذ. وهو يغطي كلا من مصادر الطاقة التقليدية والمتجددة. ٣.." تحليل وإدارة أنظمة الطاقة" بقلم فرانسيس فانيك ولويس أولبرايت. - يركز على تحليل وإدارة أنظمة الطاقة، ويغطي نمذجة الطاقة، والتحسين، وجوانب الاستدامة. ٤.." نمذجة ومحاكاة الأنظمة الديناميكية" بقلم روبرت إل وودز وكينت إل لورانس. - يوفر هذا الكتاب المدرسي أساسا متينا في نمذجة النظام الديناميكي وتقنيات المحاكاة، والتي تنطبق بشكل كبير على تحليل نظام الطاقة. ٥.." أنظمة الطاقة المتجددة: نهج أنظمة الطاقة الذكية لاختيار ونمذجة الحلول المتجددة بنسبة ١٠٠٪ "بقلم هنريك لوند. - يغطي نمذجة وتحليل أنظمة الطاقة المتجددة ودمجها في مزيج الطاقة. ٦.." أنظمة الطاقة: نهج جديد لهندسة الديناميكا الحرارية" بقلم بيتر دبليو بريدجمان. - يقدم منظورا هندسيا لأنظمة الطاقة والديناميكا الحرارية وعمليات تحويل الطاقة، مما يوفر أساسا قويا للنمذجة. ٧.." تحويل الطاقة" بقلم د. يوغي جوسوامي وفرانك كريث. - يركز على مبادئ تحويل الطاقة، بما في ذلك نمذجة ومحاكاة تقنيات تحويل الطاقة المختلفة. ٨.." مقدمة في الطاقة والبيئة" بقلم فينتشنزو بيانكو وباولو سيانو. - يغطي أساسيات أنظمة الطاقة ومصادر الطاقة وتأثيرها البيئي. ويشمل جوانب النمذجة المتعلقة بالاستدامة. ٩.." اقتصاديات الطاقة: المفاهيم والقضايا والأسواق والحوكمة" بقلم Subhes C. Bhattacharyya. - بينما يركز هذا الكتاب بشكل أساسي على الاقتصاد، يستكشف نمذجة نظام الطاقة في سياق التحليل الاقتصادي. ١٠.." الطاقة التطبيقية: مقدمة" لمحمد عمر عبد الله. - يوفر مقدمة لمختلف مصادر الطاقة وتقنيات التحويل وتقنيات النمذجة لأنظمة الطاقة.
المراجع الرئيسة (المصادر)	"أنظمة الطاقة والاستدامة: الطاقة من أجل مستقبل مستدام" بقلم بوب إيفريت وجودفري بويل وستيفن بيك يغطي هذا المرجع جوانب مختلفة من أنظمة الطاقة والاستدامة ونهج النمذجة.
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	"الطرق الرياضية التطبيقية للمهندسين" بقلم لويس أ. بابيس ولورانس آر هارفيل مورد متعمق للطرق والتقنيات الرياضية المستخدمة بشكل شائع في نمذجة نظام الطاقة.
المراجع الإلكترونية، مواقع الانترنيت	١.. وكالة الطاقة الدولية (IEA). - [الموقع الإلكتروني] (https://www.iea.org/) - توفر وكالة الطاقة الدولية ثروة من البيانات والتقارير والتحليلات المتعلقة بأنظمة الطاقة، بما في ذلك الطاقة المتجددة وكفاءة الطاقة وخرائط طريق تكنولوجيا الطاقة. ٢. إدارة معلومات الطاقة الأمريكية (EIA). - [الموقع الإلكتروني] (https://www.eia.gov/) - يقدم تقييم الأثر البيئي بيانات شاملة عن إنتاج الطاقة واستهلاكها واتجاهاتها، إلى جانب التحليلات والتقارير المتعلقة بأسواق وسياسات الطاقة. ٣.. المختبر الوطني للطاقة المتجددة (NREL). - [الموقع الإلكتروني] (https://www.nrel.gov/) - يقدم موقع NREL مجموعة من الموارد حول تقنيات الطاقة المتجددة، بما في ذلك الأوراق البحثية والتقارير وأدوات المحاكاة.

	٤.. مركز البحوث المشتركة التابع للمفوضية الأوروبية (JRC). - [الموقع الإلكتروني] (https://ec.europa.eu/jrc/en) - يوفر JRC أدوات البحث والبيانات والنمذجة المتعلقة بقضايا الطاقة والبيئة داخل الاتحاد الأوروبي. ٥.. تبادل معلومات الطاقة (EiX). - [الموقع الإلكتروني] (https://energyinformatics.eu/) - EiX عبارة عن منصة تقدم مجموعات البيانات والأدوات والموارد المتعلقة بالطاقة للبحث والتعليم في مجال الطاقة. ٦.. إنرجي بلس. - [موقع الويب] (https://energyplus.net/) - EnergyPlus هو برنامج محاكاة طاقة البناء الذي يمكن استخدامه لنمذجة وتحليل استهلاك الطاقة والأداء الحراري للمباني. ٧.. هوميروس للطاقة. - [الموقع الإلكتروني] (https://www.homerenergy.com/) - HOMER هو برنامج لتحسين تصميم نظام الطاقة الصغيرة والموزعة واتخاذ القرار. ٨.. نموذج مستشار النظام (SAM). - [موقع الويب] (https://sam.nrel.gov/) - SAM هو نموذج أداء ومالي مصمم لتسهيل اتخاذ القرارات لمشاريع الطاقة المتجددة. ٩.. نموذج الطاقة المتكاملة PLEXOS®. - [الموقع الإلكتروني] (https://www.energyexemplar.com/plexos/) - PLEXOS هو برنامج يستخدم على نطاق واسع لمحاكاة وتحليل سوق الطاقة، بما في ذلك تكامل مصادر الطاقة المختلفة. ١٠.. معهد ماساتشوستس للتكنولوجيا OpenCourseWare (OCW) - دورات الطاقة. - [موقع الويب] (https://ocw.mit.edu/index.htm) - يوفر معهد ماساتشوستس للتكنولوجيا OCW وصولا مجانيا إلى مواد الدورة التدريبية من مختلف الدورات التدريبية المتعلقة بالطاقة، بما في ذلك المحاضرات والواجبات والقراءات. ١١.. دورات الطاقة كورسيرا وإدكس. - [كورسيرا] (https://www.coursera.org/) | [edX] (https://www.edx.org/) - تقدم المنصات عبر الإنترنت مثل Coursera وedX مجموعة من الدورات التدريبية المتعلقة بالطاقة، والتي يوفر بعضها وصولا مجانيا إلى مواد الدورة التدريبية. ١٢.. عالم الطاقة المتجددة. - [الموقع الإلكتروني] (https://www.renewableenergyworld.com/) - يقدم هذا الموقع الأخبار والمقالات والرؤى المتعلقة بتقنيات الطاقة المتجددة وسياساتها واتجاهاتها.

اللغة الإنكليزية

نموذج وصف المقرر

١٣. اسم المقرر
اللغة الانكليزية
١٤. رمز المقرر
Em En ElV 101616 (2+0)
١٥. الفصل / السنة

الفصل الثاني|٢٠٢٤-٢٠٢٥
١٦. تاريخ إعداد هذا الوصف
١-٩-٢٠٢٣
١٧. أشكال الحضور المتاحة
اسبوعي
١٨. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
٣٠ ساعة
١٩. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)
الاسم: م. رسل داود سلمان الآيميل :
٢٠. اهداف المقرر

اهداف المادة الدراسية	• **تنمية مهارات القراءة والكتابة والتحدث والاستماع للغة الإنكليزية.** • **تقديم دراسة نظرية شاملة عن كيفية تعلم الطالب وتطوير مهاراته.** • **تقديم لمحة عامه عن مختلف القضايا المهمة الخاصة باللغة الإنكليزية التي تساعد الطالب على التواصل بسهوله مع الاخرين.** • **تطبيق الجوانب النظرية وذلك بالسماح للطالب بممارسة اللغة وتشجيعه على التحدث مع الأجانب.** • • **اكساب الطلبة القدرة على التعبير عن آرائهم والمشاركة في النقاشات** • **استخدام الوسائل والأدوات الرقمية للمساهمة في تكوين وتفسير المعاني المطلوبة.**

٢١. استراتيجيات التعليم والتعلم	
الاستراتيجية	١. محاضرات وندوات ٢. طريقة التسجيلات الصوتية ٣. التقييم من أجل التعلم ٤. تعلم لغة المجتمع ٥. تعليم اللغة التواصلية

٢٢. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	2	1	Introduction – Giving general information about the English Language	Lectures	Feedback
2	2	1	Speaking (paired choice) asking about the general opinions about possible issues	Lectures	Quizzes and Tests

Feedback and Formative Assessment	Lectures	Speaking (campus announcement & general conversation) report on the speaker's opinion & explain why he/she feels that way	1	2	3
Feedback and Formative Assessment	Lectures & discussions	Integrated speaking (Academic reading & Lecture) explaining the academic topics & describing the main points in it.	3	2	4
Observations	Lectures & oral practicing	Listening to engineering conversations to obtain a wide vocabulary	3	2	5
Self-assessment	Lectures & Active Learning	Listening to various videos concerning the engineering fields such as: (Mechanical engineering, electrical engineering in addition to renewable energies).	3	2	6
Peer Assessment	Practicing Language	Mid-term Exam	3	2	7
Examinations		Writing (learning students how to write essays on the engineering field)	4	2	8
Peer Assessment	Lecture and test	Writing (enabling students to write	4	2	9

		their opinion about specific academic topics in general or write about engineering subjects in particular).			
Portfolios	Inquiry-Based Learning	Speaking (making the students sum up the main points of the lecture that is delivered previously)	4	2	10
Portfolios	Peer learning	Speaking (increasing the student's ability to speak fluency and increasing its rate)	4	2	11
Assignments and Projects	Reflective Learning & Experimental Learning	Listening (encourage the student to make inferences from what he/she heard before)	6	2	12
Assignments and Projects	Reflective Learning & Experimental Learning	Listening (ask the student what the speaker implies in his/her speech)	6	2	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Writing (ask the student to write the essential information in the highlighted sentences in a paragraph and make paraphrasing in to those sentences)	6	2	14
Examinations		Final Examination	٦	2	15
٢٣. تقييم المقرر					

١. التقويم المستمر ٢. الامتحانات ٣. التقييمات العملية ٤. تقييم المشاريع ٥. العروض الشفوية والدفاع ٦. التقييم بين الأقران ٧. التقييم الذاتي واليوميات الانعكاسية

٢٤. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	New Headway Plus The author: John & Liz Soars TOEFL Practice Online The official practice test that can help you go anywhere
المراجع الرئيسة (المصادر)	The Cambridge Encyclopedia of the English Language by David Crystal
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	Ciedupress.com/journal/index.php/wjel
المراجع الإلكترونية، مواقع الانترنيت	https://www.cambridge.org/.

Academic Program Description Form

University Name: University of Babylon
College/Institute: College of Engineering - Al-Musayyib
Program Name: Academic Program for obtaining an undergraduate degree, Bachelor of Science in Energy Engineering and Renewable Energies Engineering.
Final Degree Name: Bachelor of Science in Energy Engineering and Renewable Energies
Academic System: Bologna System
Description Preparation Date: ٩/٤/202٣
File Completion Date: 3/5/2026

The file was prepared by the Academic Description Committee in the Department of Energy Engineering and Renewable Energies. The coordinator here is a committee, not an individual, which was formed by Administrative Order D/8/3124 on 14/10/2025. The committee consists of: (Assist. Prof. Dr. Hussein Ali Hassan – the head, and members: Assist. Lec. Amani Yassin Taha, Assist. Engineer Dhuha Hani Mizhir, Ms. Sabaa Haider Kadhim)

Signature of the Head of the Quality Assurance Committee in the Department of Energy Engineering and Renewable Energies

Assist. Prof. Dr. Hussein Ali Hassan
Date: 3/5/2026

File reviewed by the Quality Assurance and University Performance Unit in the College Director of the Quality Assurance and University Performance Unit:

Assist. Lec. Abbas Rashid Hatif
Date: 3/5/2026

Signature of the Department Head:

Assist. Prof. Dr. Ali Jaber Abdulhamed
Date: 3/5/2026

Signature of the Assistant Dean for Academic Affairs:

Assist. Prof. Dr. Sana'a Abdul Razzaq Jassim
Date: 3/5/2026

Endorsement by the Dean

Signature
Assist. Prof. Dr. Wissam Jaleel Khudayer
Date: 3/5/2026

1. The program Vision

Leadership in engineering education and learning in the field of energy and renewable energy engineering, with excellence in scientific research locally and globally, while providing community services and meeting the needs of the labor market.

2. The Program message

Active contribution to the advancement of energy and renewable energy engineering by preparing competent engineering graduates with high professional skills and ethics, supporting the labor market and society, and producing rigorous applied scientific research that serves and develops the field of specialization.

3. The Program Goals

1. Preparing Competent Engineers who possess both theoretical and practical knowledge and skills in the fields of conventional and renewable energy engineering, enabling them to practice the profession efficiently and meet labor market demands.
2. Contributing to Sustainable Development through conducting applied research, offering scientific and technical consultations, and collaborating with industrial and research institutions both locally and internationally.
3. Promoting Lifelong Learning and Professional Development through training, seminars, scientific courses, and encouraging scholarships and graduate studies to keep up with global advancements.
4. Integrating Modern Technology, particularly information systems, into curricula and research methodologies to enhance the quality of education and research to global standards.

4. Program accreditation

Does the program have program accreditation? From which side?
The application for accreditation has already been submitted Iraqi Council for Accreditation of Engineering Education

5. Other external influences

Is there a sponsor for the program?
Governmental support (Ministry of Higher Education and Scientific Research)

6. Program structure				
Program structure	**Number of courses**	**Study unit**	**percentage**	**Comments***
Enterprise requirements	9	18	7.5%	core
College requirements	3	18	7.5%	core
Department requirements	41	204	85%	core
summer training	-	-	-	-
Other				

* Notes may include whether the course is core or elective.

7. Program description				
Year/level	**Course or code module**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The first stage/ The first semester	ERE1101	Engineering Drawing and Auto-CAD I	٤	٢
	ERE1102	Electrical Circuits	٣	٢
	ENM1102	Mathematics I	٤	٠
	ENM1101	Physics	٢	٢
	UOBABb4	Fundamental of Computer	١	٢
	UOBAB0301016	Arabic Language	٢	٠
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The first stage/ The second semester	ERE1211	Engineering Drawing and Auto-CAD II	3	٢
	ERE1202	Engineering Mechanics	5	٠
	ENM1213	Mathematics II	٤	٠
	ERE1203	Manufacturing Processes & Engineering Workshop	1	٢
	ERE1204	Chemistry	٢	٢
	UOBABb1101	English Language I	٢	٠
	UOBAB1104	Human Rights and Democracy	2	0
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The second stage/	ERE2311	Thermodynamics I	3	٢
	ERE2312	Fluid Mechanics I	٣	٢
	ERE2313	Engineering Mathematics	3	٠
	ERE2304	Strength of Materials	3	2

The first semester	ERE2305	Material Science	2	0
	UOBAB2302	English Language II	2	0
	UOBAB2301	Al-Ba'ath party crimes	2	0
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The second stage/ The second semester	ERE2411	Thermodynamics II	3	٢
	ERE2412	Fluid Mechanics II	3	2
	ERE2403	Electronic Circuits	2	٢
	ERE2404	Principles of Energy Engineering	4	0
	ERE2416	Engineering Mathematics II	4	0
	ERE2405	Computer Programming (MATLAB)	1	1
	UOBAB2004	Computer Science II	1	2
	UOBAB2001	Arabic Language II	2	0
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The third stage/ The first semester	Em En Hti 303501 (2+2)	Heat and Mass Transfer I	3	2
	Em En Eai 303402 (2+0)	Engineering Analysis	3	0
	Em En Mdi 303503 (2+0)	Mechanical Element Design	3	0
	Em En Emi 303604 (2+2)	Electrical Machines	2	2
	Em En Fci 303705 (2+0)	Fuels and Combustion Energy	3	0
	Em En Epi 303806 (2+0)	Electrical Power Systems I	3	0
	Em En Wmi 303907 (2+0)	Waste Management and Energy Recovery	2	0
	Em En Wmi 304008 (2+0)	Energy Storage Systems	3	2
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The third stage/ The second semester	Em Ht Maii 304109 (2+2)	Heat and Mass Transfer II	3	2
	Em En Naii 304210 (2+0)	Numerical analysis	3	0
	Em En MDii 304311 (2+0)	Mechanical System Design	3	0
	Em In Seii 304412 (1+2)	Solar Energy	2	2
	Em In Icii 304513 (2+2)	Internal Combustion Engines	2	2
	Em En Epii 304614 (2+0)	Electrical Power Systems II	3	0

	Em En Nnii 304715 (2+0)	Nanomaterials and Nanotechnology	3	0
	Em En Heii 304816 (1+2)	Hydrogen Energy and Fuel Cell Technology	2	2
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The fourth stage/ The first semester	Em En Iei 404901 (2+2)	Instrumentation in Energy Systems	3	2
	Em En Eei 405002 (2+0)	Energy Management and Economics	2	0
	Em En Pei 405103 (2+2)	Power Electronics	3	2
	Em En Dri 405204 (2+0)	Design of Renewable Energy Systems I	3	0
	Em En Ppi 405305 (2+0)	Power Plants I	3	0
	Em In Bei 405406 (1+2)	Bioenergy	2	2
	Em En Nei 405507 (2+0)	Nuclear Engineering	3	0
	Em En Gpi 405608 (2+0)	Graduation Project I	2	0
Year/level	**Course or module code**	**Name of the course or module**	**Credit hours**	
			Theoretical	**Practical**
The fourth stage/ The second semester	Em En Csii 405709 (3+0)	Control in Energy Systems	3	2
	Em En Eeii 405810 (2+2)	Energy and Environment	2	0
	Em EnYes405911 (2+0)	Industrial Engineering	2	0
	Em In Drii 406012 (2+0)	Design of Renewable Energy Systems II	3	0
	Em En Ppii 406113 (1+2)	Power Plants II	3	1
	Em En Weii 406214 (1+2)	Wind Energy	2	2
	Em En Msii 406315 (2+0)	Modeling and Simulation of Energy Systems	2	2
	Em En ElV 101616 (2+0)	English Language IV	2	0
	Em En Gpii 406416 (1+2)	Graduation Project II	2	0

8. Expected learning outcomes of the programme	
Knowledge	
The ability to analyze the performance of thermal and gas electrical power generation plants through the ability to distinguish, identify, define, formulate and solve engineering problems by applying the principles of engineering, science and mathematics.	Learning outcomes 1
Knowledge and familiarity with the most important technologies used in the design and manufacture of energy production systems through the ability to realize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile and apply it correctly.	Learning outcomes 6
Skills	
The ability to produce engineering designs that meet the required needs represented by the requirements of international specifications for energy production and renewable energies, the requirements of the labor market and stakeholders within the restrictions of the type of use and other determinants through analysis and synthesis processes in the design process.	Learning outcomes 2
The ability to evaluate power generation systems and renewable energies and their impact on the amount of environmental pollution through the ability to create and implement appropriate measurements and tests. The ability to evaluate control systems and their efficiency in power generation stations, as well as the student's knowledge of the work and design of these stations to ensure the achievement of quality requirements, analyze the results, and be able to judge them in engineering to reach conclusions.	Learning outcomes 3
The ability to effectively lead and manage work teams, set goals according to capabilities, properly plan to achieve them, adhere to completion dates, and manage risk and uncertainty.	Learning outcomes 7
Value	
The ability to communicate effectively orally with a group of people and in writing with various administrative levels and for various purposes.	Learning outcomes 4
The ability to recognize ethical and professional responsibilities in engineering issues and make sound judgments that take into account their consequences in the financial, environmental and societal fields on a global level.	Learning outcomes 5

9. Teaching and learning strategies
1- Method of giving lectures. 2- Student groups 3- workshops 4- Scientific trips to follow up on the practical reality of the nature of renewable energy production 5- E-learning on campus 6- Experiential learning

1. Evaluation methods
Exams, continuous assessment, reports, incentives, and feedback from students

1. education institution						
College members						
Preparing the teaching staff		**Special requirements/skills (if any)**		**Specialization**		**Scientific rank**
lecturer	**Permanent staff**			**private**	**general**	
	Permanent staff				general	Assistant Professor Ali Jaber Abdel Hamid - Ph.D.
	Permanent staff				general	Assistant Professor Wissam Jalil Khudair - Ph.D.
	Permanent staff				general	Assistant Professor Sanaa Abdul Razzaq Jassim - Ph.D.
	Permanent staff				general	Assistant Professor Ali Jassim Hussein - Ph.D.
	Permanent staff				general	Professor Wathiq Nasser Hussein - Ph.D.
	Permanent staff				general	Professor Hussein Ali Hassan - Ph.D.
	Permanent staff				general	Lecturer Aws Akram Mahmoud - Ph.D.
	Permanent staff				general	Lecture Muhammad Ali Muhammad - Ph.D.

	Permanent staff				general	Lecturer Ahmed Walid Hussein - Ph.D.
	Permanent staff				general	Lecturer Ali Muhammad Miqdad - Ph.D.
	Permanent staff				general	Lecturer Fouad Abdel Amir Khalaf - Ph.D.
	Permanent staff				general	Lecturer Mohamed Abdul Dayem – Master 's degree
	Permanent staff				general	Lecturer Muhannad Jaber Yasser – Master's degree
	Permanent staff				general	Assistant Lecturer Omar Ahmed Naeem - Master’s degree
	Permanent staff				general	Assistant Lecturer Ahmed Mohammed Merza – Master's degree
	Permanent staff				general	Assistant Lecturer Dhi Saadi Naji – Master's degree
	Permanent staff				general	Assistant Lecturer Amani Yassin Taha – Master's degree

Professional development

Orienting new college members

Submit New College members to a distinguished orientation program with the support of the university by holding training courses in which old, experienced College members lecture to realize their potential as professors, researchers, and innovators, enabling them to participate and communicate in a positive environment that helps them integrate into the university community, and introduces them to the university environment, including its characteristics, basic values, and responsibilities. related to rights and performance.

Professional development for college members

The teaching staff is subject to a group of activities, events, meetings, and scientific training provided by the relevant university entity to provide its employees in all programs with more knowledge, skills, and techniques related to the exercise of their professional roles (teaching, scientific research, community service).Under the heading of training and Professional development to improve the skills and knowledge of College members and academic leaders in all fields that enable them to carry out their assigned tasks to the fullest extent.

10.Acceptance standard

Central: A student who is accepted into universities is required to be:

1. Iraqi nationality.
2. Possessor of an Iraqi preparatory school certificate supported by certification from the General Directorate of Education in the governorate or an equivalent certificate.
3. The student must be born in 1995 onwards
4. Successful in the medical examination according to the conditions specific to each study, and the blind student (who meets the conditions for applying for appropriate humanitarian studies through central admission) will be able to apply.
5. Dedicated to study. It is not permissible to combine work and study (at the same time) in colleges and morning institutes. This includes employees of all government institutions. In order for them to continue studying in the morning, they must obtain study leave from their departments starting in accordance with the instructions in force. It is also not permissible to combine two studies. If it is proven otherwise, he must write to the Ministry to cancel his acceptance.
6. Of my graduates:
   A- The current academic year.
   B- The previous academic year of those who are not centrally accepted into any college or institute, and they are accepted according to the minimum limits for the year of their graduation.
7. Non-Iraqi students who hold an Iraqi preparatory certificate and are accepted centrally will be informed in writing to review the Central Admissions Department / Expatriates Division to state their exemption or claim for tuition fees in foreign currency according to the controls mentioned in Chapter Seven.

11.The most important sources of information about the program

The college and university website

University guide

The most important books and resources for the department

1. Control Engineering, Uday A. Bakshi and Varsha U. Bakshi, Technical Publications, Pune
2. Control Engineering, D. Ganesh Rao and K. Channa Venkatesh, Sanguine Technical Publishers, Bangalore

12.Program development plan

Includes Realistic improvement plans derived from consideration of available evidence and evaluations. It may be applied for more than one year, but it is prepared and reviewed every year at the level of academic courses, programs, and educational institution.

Program skills chart

Learning outcomes required from the programme										
Value		**Skills**			**Knowledge**		**Core or elective**	**Course Name**	**Course Code**	**Year/level**
٢	١	٣	٢	١	٢	١				
		*	*	*	*	*	**Core**	Engineering Drawing and Auto-CAD I	ERE1101	**The first stage/The first semester**
*	*	*	*		*	*		Electrical Circuits	ERE1102	
		*	*	*	*	*		Mathematics I	ENM1102	
*	*	*	*	*	*	*		Physics	ENM1101	
*	*	*	*	*	*	*		Fundamental of Computer	UOBABb4	
		*	*	*	*	*		Arabic Language	UOBAB0301016	
		*	*	*	*	*	**Core**	Engineering Drawing and Auto-CAD II	ERE1211	**The first stage/The second semester**
*	*	*	*	*	*	*		Engineering Mechanics	ERE1202	
		*	*	*	*	*		Mathematics II	ENM1213	
*	*			*	*	*		Manufacturing Processes & Engineering Workshop	ERE1203	
*	*	*	*		*	*		Chemistry	ERE1204	
		*	*	*	*	*		English Language I	UOBABb1101	
*	*	*						Human Rights and Democracy	UOBAB1104	
		*	*	*	*	*	**Core**	Thermodynamics I	ERE2311	**The second stage/The first semester**
*	*	*	*	*	*	*		Fluid Mechanics I	ERE2312	
		*	*	*	*	*		Engineering Mathematics	ERE2313	
*	*			*	*	*		Strength of Materials	ERE2304	
*	*	*	*		*	*		Material Science	ERE2305	
		*	*	*	*	*		English Language II	UOBAB2302	
*	*	*						Al-Ba'ath party crimes	UOBAB2301	
			*	*	*	*	**Core**	Thermodynamics II	ERE2411	**The second stage/The second semester**
*	*	*	*	*	*	*		Fluid Mechanics II	ERE2412	
	*		*	*	*	*		Electronic Circuits	ERE2403	
	*			*	*	*		Principles of Energy Engineering	ERE2404	

*				*		*		Engineering Mathematics II	ERE2416	
*		*	*		*	*		Computer Programming (MATLAB)	ERE2405	
	*	*			*	*		Computer Science II	UOBAB2004	
*	*	*						Arabic Language II	UOBAB2001	
		*	*	*	*	*	**Core**	Heat and Mass Transfer I	Em En Hti 303501 (2+2)	**The third stage/The first semester**
*	*	*	*		*	*		Engineering Analysis	Em En Eai 303402 (2+0)	
*	*	*	*		*	*		Mechanical Element Design	Em En Mdi 303503 (2+0)	
		*	*	*	*	*		Electrical Machines	Em En Emi 303604 (2+2)	
*	*	*	*	*	*	*		Fuels and Combustion Energy	Em En Fci 303705 (2+0)	
*	*	*	*	*	*	*		Electrical Power Systems I	Em En Epi 303806 (2+0)	
*	*			*	*	*		Waste Management and Energy Recovery	Em En Wmi 303907 (2+0)	
		*	*	*	*	*		Energy Storage Systems	Em En Wmi 304008 (2+0)	
		*	*	*	*	*	**Core**	Heat and Mass Transfer II	Em Ht Maii 304109 (2+2)	**The third stage/The second semester**
*	*	*	*		*	*		Numerical Analysis	Em En Naii 304210 (2+0)	
*	*	*	*		*	*		Mechanical System Design	Em En Mdii 304311 (2+0)	
		*	*	*	*	*		Solar Energy	Em En Seii 304412 (1+2)	
*	*	*	*	*	*	*		Internal Combustion Engines	Em En Icii 304513 (2+2)	
*	*	*	*	*	*	*		Electrical Power Systems II	Em En Epii 304614 (2+0)	
*	*			*	*	*		Nanomaterials and Nanotechnology	Em En Nnii 304715 (2+0)	
		*	*	*	*	*		Hydrogen Energy and Fuel Cell Technology	Em En Heii 304816 (1+2)	
*	*	*	*	*	*	*	**Core**	Instrumentation in Energy Systems	Em En Iei 404901 (2+2)	**The fourth**

*	*	*	*		*	*		Energy Management and Economics	Em En Eei 405002 (2+0)	**stage/The first semester**
*	*	*	*		*	*		Power Electronics	Em En Pei 405103 (2+2)	
		*	*	*	*	*		Design of Renewable Energy Systems I	Em En Dri 405204 (2+0)	
*	*	*	*	*	*	*		Power Plants I	Em En Ppi 405305 (2+0)	
*	*	*	*	*	*	*		Bioenergy	Em En Bei 405406 (1+2)	
*	*			*	*	*		Nuclear Engineering	Em En Nei 405507 (2+0)	
		*	*	*	*	*		Graduation Project I	Em En Gpi 405608 (2+0)	
*	*			*	*	*	**Core**	Control in Energy Systems	Em En Csii 405709 (3+0)	**The fourth stage/The second semester**
*	*	*	*	*	*	*		Energy and Environment	Em En Eeii 405810 (2+2)	
*	*	*	*	*				Industrial Engineering	Em En Ieii 405911 (2+0)	
*	*			*	*	*		Design of Renewable Energy Systems II	Em En Drii 406012 (2+0)	
*	*			*	*	*		Power Plants II	Em En Ppii 406113 (1+2)	
*	*	*	*					Wind Energy	Em En Weii 406214 (1+2)	
*	*	*	*	*	*	*		Modeling and Simulation of Energy Systems	Em En Msii 406315 (2+0)	
*	*				*	*		Graduation Project II	Em En Gpii 406416 (1+2)	

- Please check the boxes corresponding to the individual learning outcomes from the program subject to evaluation

Course description form

First stage\2025

Module Information					
Module Title	**Engineering Drawing and Auto-CAD I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**ERE1101**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	١٥٠			☐ **Tutorial**	
				☒ **Practical**	
				☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	One		
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Ali Mohammed Moqdad	**e-mail**	ali.ijam@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Develop proficiency in *technical communication* and production of mechanical engineering drawings. 2. Develop skills in the preparation of working and assembly mechanical drawings. 3. *Develop an understanding of the properties, uses and production of materials used in the* manufacture of engineering components. 4. Provide knowledge of the different methods of production of engineering components. 5. *Develop skills in communicating technical information using illustrations, scaled models and working drawings* to solve engineering *design* problems. 6. Develop skills in applying and drawing principles to facilitate product development and manufacture. 7. Develop *proficiency* in the use of Computer-Aided Drafting (CAD) software, *instruments, media and reference materials* to produce engineering drawings. 8. Develop an interest in mechanical engineering as disciplines and careers. *9. Develop the capacity for critical and creative thinking, problem-solving, leadership and cooperative behaviors through authentic learning experiences.*
Module Learning Outcomes	1. Know the principles of Lettering and Dimensioning. 2. Know how to construct standard engineering curves. 3. Know how to construct a number of different geometrical constructions.

	4. Know how to project solids in orthographic projection. 5. Know how to use Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”). 6. Know how to use Computer-Aided Drafting software to produce drawings (different two-dimensional figures “surfaces”).
Indicative Contents	**Indicative content includes the following.**[150] • Drawing Instruments and Accessories. [12 hrs.] • Lettering and Dimensioning Practices. [12 hrs.] • Geometrical Constructions. [46 hrs.] • Orthographic Projections. [40 hrs.] • Computer-Aided Drafting software (two-dimensional figures). [40 hrs.]

Learning and Teaching Strategies	
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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	95	**Structured SWL per Week (h/w)**	6
Unstructured SWL per Semester (h/sem)	55	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	١٥٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	5% (20)	5 and 10	LO #3, #4, #5, and #6
	Class Assignment	15	1.5% (22.5)	Continuous	All
	Home work	15	0.5% (7.5)	Continuous	LO #3, #5 and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Drawing instruments and accessories, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 2	Lettering and dimensioning practices, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 3	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 4	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 5	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 6	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).

Week 7	Geometrical constructions, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 8	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 9	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 10	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 11	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 12	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 13	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 14	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 15	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Drawing instruments and accessories, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 2	Lettering and dimensioning practices, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 3	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 4	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 5	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 6	Geometrical constructions, Computer-Aided Drafting software to produce drawings (user interface, one-dimensional figures “different lines”).
Week 7	Geometrical constructions, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 8	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 9	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 10	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 11	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 12	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 13	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 14	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).
Week 15	Orthographic projections, Computer-Aided Drafting software to produce drawings (different surfaces).

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Engineering drawing, Abdul Rasoul Al Khafaf, University of Technology, Baghdad, Iraq, 1990.	Yes
Recommended Texts	Handbook of engineering drawing and AutoCAD, Mohammad Abid Muslim Altufaily, University of Babylon, Iraq, 2007	Yes
Websites	https://youtu.be/zL1BA-mcjcc	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors

	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information

Module Title	**Electrical Circuits**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**ERE1102**	
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	UGI	**Semester of Delivery**	One
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohammed Ali Al-Shuraifi	**e-mail**	Msb.Mohammed.Ali@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

	1. To study Ohm's law 2. To study electrical circuits; series, parallel, and series-parallel in DC 3. To apply methods of analysis on DC circuits

Module Objectives	4. To apply electrical theorems on DC circuits 5. To understand the sinusoidal waveforms in electrical circuits. 6. To understand the response of Capacitor, Inductor, and resistor. 7. To understand the complex numbers. 8. To perform conversion between time domain and phasor domain and vice versa. 9. To apply the methods of analysis in AC circuits 10. To apply the circuit theorems in AC circuits 11. To understand power in AC circuits

Module Learning Outcomes	1. Studying ohm's law 2. Studying types of circuits in DC and methods to analyze them. 3. Recognize AC components and their response; capacitor, inductor, and resistor. 4. List the various terms associated with AC electrical circuits. 5. Understand complex numbers in order to apply them in AC circuits 6. Discuss the average and the rms values. 7. Apply Kirchhoff's laws on AC circuits 8. Understand methods of analysis in AC circuits 9. Apply electrical theorems in AC circuits.
Indicative Contents	**Indicative content includes the following**. Part A - Circuit Theory • studying DC electrical circuits. [12 hrs] • analyzing DC electrical circuits. [13 hrs] • Sinusoidal waveforms, average (DC) value, effective (rms) value [8 hrs] • Time domain and phasor domain. [8 hrs] • Complex numbers: rectangular and polar form [8 hrs] • Methods of circuit analysis and their applications on ac circuits; mesh and nodal methods. [12 hrs] • Electrical circuit theorems and their application on AC circuits: Superposition, Thevenin, And Norton. [12 hrs] • Power in AC circuits: power triangle, real power, reactive power, and apparent power; impedance triangle. [12 hrs]

Learning and Teaching Strategies	
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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	93	**Structured SWL per Week (h/w)**	5
Unstructured SWL per Semester (h/sem)	57	**Unstructured SWL per Week (h/w)**	5
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		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**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٢hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	DC circuits; series, parallel, series-parallel
Week 2	Methods of analyzing DC circuits
Week 3	Electrical theorems
Week 4	Review of Kirchhoff's Laws on AC circuits
Week 5	Star delta and delta star conversion in AC circuits
Week 6	RLC circuits
Week 7	Mid-term Exam
Week 8	Series and parallel circuits
Week 9	Series – parallel circuits in AC circuits
Week 10	Methods of analysis in AC circuits I
Week 11	Methods of analysis in AC circuits II
Week 12	Electrical theorems in AC circuits I
Week 13	Electrical theorems in AC circuits II
Week 14	Power and power triangle
Week 15	Power, apparent power, reactive and real power
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: series-parallel DC circuits
Week 2	Lab 2: Norton's theorem
Week 3	Lab 3: RLC circuits
Week 4	Lab 4: Kirchhoff's laws
Week 5	Lab 5: mesh method
Week 6	Lab 6: superposition theorem
Week 7	Lab 7: Thevenin theorem

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Introductory circuit analysis by Boylestad	Yes
Recommended Texts	Introductory circuit analysis by Boylestad	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group	**A -** Excellent	90 - 100	Outstanding Performance

(50 - 100)	**B** - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
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Fail Group (0 – 49)	**FX** – Fail **(Under Review)**	(45-49)	More work required but credit awarded
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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.

Module Information
معلومات المادة الدراسية

Module Title	**Mathematics I**	**Module Delivery**	
Module Type	**S**	☒ **Theory**	
Module Code	**ENM1102**	☐ **Lecture**	
ECTS Credits	**6**	☐ **Lab**	
SWL (hr/sem)	**150**	☒ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	UGI	**Semester of Delivery**	One
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohammed Abd Aldeem	**e-mail**	met.moh.abdaldaaem@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules

Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

	After completing the course, students should be able to:

Module Objectives	1) Enable the pupil to learn the concepts of mathematics and applications in his work. 2) To study the characteristics and properties of number sets, and obtain the number systems. 3) To understand the concept of function, to learn draw the graph of functions, to know the lists types of functions. 4) Study the meaning of limit and continuous function. 5) To understand the meaning of derivative function and applications. 6) Study the transcendental function. 7) Study the Unit vector, vector equation, cross product, dot product. 8) To knows the meaning of complex number.

Module Learning Outcomes	1) Describe the characteristics and properties of number sets, and obtain the number systems. 2) Describe and State the concept of function, draw the graph of functions, the lists types of functions. 3) To understands the meaning of limit and continuous function. 4) To knows the meaning of derivative function and applications. 5) Describe the transcendental function. 6) Describe the matrix and its operations and to know the determent of its. 7) Describe the Unit vector, vector equation, cross product, dot product. 8) To understands the meaning of complex number.
Indicative Contents	**Indicative content includes the following**. • Type of sets, type of interval, Cartesians plain. The domain and rang of functions, even and odd functions. Drawing curved function, shifting the graph. limit from the left and right. [20 hr] • The concept of continuous function, Algebraic operations on continuous functions. Methods of derivation, the chain rule. Applications on derivatives. Kind of exponential functions. Types of trigonometric functions. The inverse of the trigonometric functions. Kind of Hyperbolic functions. [20 hr] • Types of matrices, operations on matrices. Use matrices in solving linear systems of equations. Meaning vector, algebraic properties of vectors. Vector equation, cross product, dot product. Properties of complex numbers, the representation of the complex number. [20 hr]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	86	**Unstructured SWL per Week (h/w)**	6
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7,#8
	Projects				
	Report	1	10% (10)		
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

Summative assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	System numbers.
Week 2	The functions and its kinds.
Week 3	The graph of the function.
Week 4	Limit function.
Week 5	Continuous functions.
Week 6	Derivatives.
Week 7	Applications on derivatives. (Mid-term Exam)
Week 8	Exponential functions.
Week 9	The inverse trigonometric functions.
Week 10	Hyperbolic functions.
Week 11	Matrices and their types.
Week 12	Solving systems of linear equations.
Week 13	Vectors.
Week 14	The operations on the Vector.
Week 15	Complex numbers.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr, Weir Joel R. Hass ‘Calculus’ (V.12), 2014**.**	Yes
Recommended Texts	1. Howard Anton" Calculus and analytic geometry". 2. Schaum’s series " Theory and problems of calculus".	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C – Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Physics**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ENM1101**			☐ **Lecture**	
ECTS Credits	**5**			☒ **Lab**	
SWL (hr/sem)	**125**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**		One
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Ali Mohammed Ijam		**e-mail**	ali.ijam@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Analyze the atomic structure of matter at its most fundamental. 2. Recognize the state of matter and its properties. 3. Understand the forms of energy. 4. Solve problems that call for the application of conservation of energy. 5. Know the classification of the semiconductors and the mechanism behind them. 6. Explain the basic properties of light and describe some of its applications in engineering.
Module Learning Outcomes	1. Understanding the basic concepts and definitions is important in any field of study. 2. Learning the properties of individual atoms and molecules, as well as how they interact with each other. 3. knowing the physical and chemical properties of each state, such as gas, liquid, and solid, as well as understanding how the atoms and molecules interact with each other in the various states. 4. Be familiar with how the forms of energy interact with one another and how they are used. 5. Understanding how energy can be converted from one form to another as well as familiarity with the equations involved. 6. Learning how semiconductors are classified and what the mechanisms are behind each type of semiconductor. 7. Applying the light fundamental principles and how engineers are able to create complex

	technological solutions.
Indicative Contents	**Indicative content includes the following**. • Some basic concepts and definitions, how atomic structure is formed and interatomic bonding energy and classification, properties of matter, state of matter, energy sources, kinetic energy, and work. [23 hr] • Potential energy, thermal properties of matter, how heat and law of thermodynamics applied, what are the fluid characteristics, electric field, and potential. [22 hr] • Classifications of Conductor and insulator materials, semiconductors, propagation of light and optics characteristics, and elements of solid-state physics. [15 hr]

Learning and Teaching Strategies	
Strategies	This module will be taught in such a way that students will be compelled to participate in the exercises and their critical thought skills will be refined and expanded through participation. Classes and interactive tutorials will be used in order to reach this goal, as well as considering the types of simple experiments involving sampling activities that the learners might find interesting as well. The module will also include group activities, which will encourage collaboration and the exchange of ideas. This will help to create an engaging learning experience for the students and will also help them to develop their communication skills.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	61	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	**125**		

Module Evaluation					
		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%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Some basic concepts and definitions
Week 2	Atomic structure and interatomic bonding
Week 3	Properties of matter
Week 4	State of matter
Week 5	Energy sources
Week 6	Kinetic Energy and work
Week 7	Potential energy (Mid-term Exam)
Week 8	Thermal properties of matter
Week 9	Heat and law of thermodynamics
Week 10	Fluids
Week 11	Electric field and potential
Week 12	Conductor and insulator materials

Week 13	Semiconductors
Week 14	Lights and optics
Week 15	Elements of solid-state physics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Photon energy
Week 2	Lab 2: Data analysis for calculating Plank's constant
Week 3	Lab 3: Energy distribution
Week 4	Lab 4: Electrical properties of insulated materials
Week 5	Lab 5: Light interaction with matter

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Halliday, D., Resnick, R., & Walker, J. (2013). Fundamentals of physics. John Wiley & Sons.	Yes
Recommended Texts	Radi, H., & Rasmussen, J. O. (2013). Principles of physics. Springer.	Yes
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A** – Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C – Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E – Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information		
Module Title	**Fundamental of Computer**	**Module Delivery**
Module Type	**B**	

Module Code	**UOBABb4**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
ECTS Credits	**4**	
SWL (hr/sem)	**100**	

Module Level	UGI	**Semester of Delivery**	One
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Omar Ahmed Naeem	**e-mail**	msb.omar.alkawak@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The computer science curriculum aims to introduce the student to computer science and the skills related to this subject. The main purpose of the course is to introduce the student to an idea about the computer and its components and how each of its parts works through an explanation of the input units, the central processing unit, the input units, the storage units, and the types of operating systems and programs Microsoft Office and how to connect to the Internet and identify and protect against virus risks.
Module Learning Outcomes	A- Cognitive objectives A1- During the school year, the student learns the basics of computer science. A2- Enabling the student to know the main principles of the most prominent concepts of computer science, their sources and types, and the mechanisms used for their purpose. A 3- Enabling the student to know all the basics that he uses in the scientific subject A 4- Definition of computer, its development history and generations A 5- An explanation of the computer system with all its elements and systems A6- Introducing the student to the input unit, its principles of work, its types, and the work of the basic office programs A 7- The central processing unit, its parts, how each part works, the output unit, its working principles and types B- The skill objectives of the subject B1 - Familiarity with developments in the field of computers B2 - Familiarity with computer components B3 - Enabling the student to understand every part of the computer, how it works, and the work of the basic office programs

	B4- Giving the student an opportunity to explain a small part of the class to his classmates to enhance his self-confidence. B5- Solve a small part of the homework to urge the students to complete the solution, give class assignments, and make groups to solve these assignments.
Indicative Contents	The students will be able to identify the values, trends and patterns of behavior that uphold the ethics of the profession and work to adhere to them after graduation. 1-Urging the student to understand the objective of studying the subject in general. 2-Urging the student to think about how to develop oneself in the field of computers. 3 -Making the student able to deal with the computers and how to use the programs in accordance with the rules and regulations of engineering.

Learning and Teaching Strategies	
Strategies	1. The teacher prepares lectures on the subject in soft electronic form and presents them to the students. 2. The teacher gives lectures in detail. 3. the teacher requests periodic reports and homework on the basic subjects of the subject. 4. Academic methods and lectures 5. Dialogue modalities 6. Use projectors 7. Providing the student with basic and secondary topics related to computer work 8. Translating theoretical topics and vocabulary related to computer technologies 9. Requiring the student to follow developments in computer science

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	49	**Structured SWL per Week (h/w)**	3
Unstructured SWL per Semester (h/sem)	51	**Unstructured SWL per Week (h/w)**	1
Total SWL per Semester (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3 and 15	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 15	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%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Computers: their generations, components: hardware and software
Week 2	(Input and output) (system software and application software).
Week 3	Windows operating system Windows concept, advantages, basic requirements
Week 4	Windows The concept of a window for any program and identifying its main components, folders, and files and how to deal with them
Week 5	Windows Learning about My Computer and Control Panel components
Week 6	Output devices such as (printer and ways to deal with it)
Week 7	Word (document building and formatting methods)
Week 8	Word (document building and formatting methods)

Week 9	**Midterm Exam**
Week 10	Excel program (data building, processing, and ways to extract it)
Week 11	Excel program (data building, processing, and ways to extract it)
Week 12	PowerPoint program (building and coordinating presentations)
Week 13	PowerPoint program (building and coordinating presentations)
Week 14	The concept of computer viruses: how to infect, types and treatment
Week 15	The Internet: a definition of how to deal with the Internet, Internet browsers, web searches and e-mail
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Computers: their generations, components: hardware and software
Week 2	(Input and output) (system software and application software).
Week 3	Windows operating system Windows concept, advantages, basic requirements
Week 4	Windows The concept of a window for any program and identifying its main components, folders, and files and how to deal with them
Week 5	Windows Learning about My Computer and Control Panel components
Week 6	Output devices such as (printer and ways to deal with it)
Week 7	Word (document building and formatting methods)
Week 8	Word (document building and formatting methods)
Week 9	**Midterm Exam**
Week 10	Excel program (data building, processing, and ways to extract it)
Week 11	Excel program (data building, processing, and ways to extract it)
Week 12	PowerPoint program (building and coordinating presentations)
Week 13	PowerPoint program (building and coordinating presentations)
Week 14	The concept of computer viruses: how to infect, types and treatment
Week 15	The Internet: a definition of how to deal with the Internet, Internet browsers, web searches and e-mail
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Computer basics and office applications / 4 parts - Prof. Dr. Ghassan Hamid Abdel Majeed and Dr. Ziyad Muhammad Abboud and others.	No
Recommended Texts	1. William Stallings, Computer Organization & Architecture, Sixth edition, Pearson Education 2. Donald H. Sanders, Computer today, Second edition, McGraw –hill 3. Lectures provided by the subject teacher 4. Books available in the college library	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**B**			☒ **Theory**	
Module Code	**UOBAB0301016**			☐ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	One	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Noor Mohammed Jasim		**e-mail**	msb.noor.mohammed@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. **Language Proficiency:** The primary objective is to enable learners to develop comprehensive proficiency in Arabic reading, writing, speaking, and listening. This includes enhancing vocabulary, grammatical accuracy, pronunciation, and overall comprehension skills. 2. **Communication Skills:** To foster learners' ability to communicate effectively in Arabic, focusing on practical language usage, such as engaging in conversations, expressing opinions, and participating in various communicative activities.

	3. **Cultural Understanding:** To promote cultural awareness and a deeper understanding of the Arab world, introducing learners to the customs, traditions, literature, history, and social aspects associated with Arabic-speaking nations. 4. **Functional Language Usage:** To equip learners with the necessary linguistic tools for specific tasks and functions, including vocabulary and phrases related to travel, commerce, healthcare, and professional business interactions. 5. **Linguistic Accuracy:** To emphasize the development of grammatical precision and proper language usage, including the study of Arabic syntax and morphology to produce coherent, error-free communication. 6. **Independent Learning:** To encourage learners' ability to explore and study the Arabic language independently beyond the classroom by developing effective language acquisition strategies and utilizing self-study resources. 7. **Assessment and Progress:** To systematically evaluate learners' progress and provide constructive feedback, allowing both students and instructors to assess achievements and identify areas for further development.

Module Learning Outcomes	1. **Listening Comprehension:** Demonstrate the ability to understand spoken Arabic across various topics and contexts, including conversations, presentations, and audio recordings. 2. **Reading Comprehension:** Show proficiency in reading and comprehending written Arabic texts of varying difficulty, such as articles and stories, while extracting relevant information. 3. **Speaking Proficiency:** Communicate effectively in Arabic by expressing ideas and opinions orally, engaging in discussions, and delivering presentations with appropriate vocabulary, grammar, and pronunciation. 4. **Writing Proficiency:** Produce clear, coherent, and grammatically accurate written texts in Arabic, including essays, reports, and formal correspondence, while applying proper spelling and punctuation. 5. **Vocabulary and Grammar:** Demonstrate a broad range of vocabulary and a solid grasp of Arabic grammatical structures to express thoughts accurately in both written and spoken forms. 6. **Cultural Awareness:** Exhibit an understanding of the cultural aspects of Arabic-speaking countries, including customs, traditions, and social norms, while respecting cultural diversity. 7. **Linguistic Fluency:** Develop fluency in Arabic by speaking and responding spontaneously and maintaining conversations confidently across different communicative situations. 8. **Critical Thinking:** Apply critical thinking skills to analyze and evaluate Arabic texts, formulate supported opinions, and demonstrate understanding beyond the surface level. 9. **Independent Learning:** Take responsibility for self-directed learning by utilizing resources and strategies to continuously develop Arabic language proficiency. 10. **Intercultural Communication:** Engage in effective intercultural communication by adapting language usage to diverse cultural perspectives and demonstrating respect for different viewpoints.
Indicative Contents	• **Subject and Predicate (Al-Mubtada' wa Al-Khabar):** Constructing sentences using the subject (Mubtada') and predicate (Khabar). • **Linguistic Corrections:** Identify and apply essential linguistic corrections. • **Punctuation Marks:** Utilize appropriate punctuation marks correctly to enhance the clarity and structure of written Arabic. • **Hamza of 'Inna' (Fat-ha and Kasra):** Rules for the mandatory opening (Fat-ha) and breaking (Kasra) of the Hamza in "Inna." • **Narrative Literature:** Demonstrate a comprehensive understanding of the characteristics and development of Arabic narrative literature. • **Arabic Literature:** Enhance the student's linguistic wealth and vocabulary through the study of diverse Arabic literary texts. • **Free Verse vs. Classical Poetry**: Differentiate between the structural and rhythmic characteristics of Classical (Columnar) poetry and Free Verse poetry.

	• **The Rules of Numbers:** Apply the correct grammatical rules for writing and using numbers in Arabic sentences. • **Hafez Ibrahim:** Provide a scholarly biography and literary analysis of the life and works of the poet Hafez Ibrahim. • **Badr Shakir al-Sayyab**: Provide a scholarly biography and literary analysis of the life and works of the poet Badr Shakir al-Sayyab. • **Al-Jawahiri:** Provide a scholarly biography and literary analysis of the life and works of the poet Muhammad Mahdi Al-Jawahiri. • **Hamzat al-Qat'**: Identify and extract the "Hamzat al-Qat'" correctly within various Arabic texts.

Learning and Teaching Strategies	
Strategies	• **Communicative Approach:** Emphasizing meaningful Arabic communication through authentic conversations, role-plays, and real-life scenarios to develop speaking and listening skills. • **Integrated Skills:** Integrating listening, speaking, reading, and writing through activities that reinforce these skills simultaneously, such as reading then discussing and responding and writing a reflective response. • **Authentic Materials:** Incorporating real-world Arabic content, including news articles, literature, and multimedia, to enhance linguistic proficiency and cultural understanding. • **Contextual Learning:** Teaching Arabic within meaningful contexts related to learners' interests and relevant life situations to ensure an engaging learning experience. • **Multimedia Approaches:** Utilizing diverse visual, auditory, and interactive resources, including online tools and language apps, to cater to various learning styles. • **Task-Based Learning:** Organizing language learning around specific tasks, such as planning trips or engaging in debates, to promote functional language use and problem-solving.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	٣٠	**Structured SWL per Week (h/w)**	٢
Unstructured SWL per Semester (h/sem)	٢٠	**Unstructured SWL per Week (h/w)**	١
Total SWL per Semester (h/sem)	٥٠		

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

Delivery Plan (Theoretical Weekly Syllabus)

	Material Covered
Week 1	Constructing sentences using the subject and predicate
Week 2	Identifying and applying essential linguistic correction
Week 3	Usage of Arabic punctuation marks
Week 4	Rules for (Fat-ha and Kasra) of Hamza of 'Inna'
Week 5	Introduction to the characteristics of Arabic narrative literature
Week 6	**Midterm Exam**
Week 7	Enhancing linguistic wealth through literary texts
Week 8	Differentiating between Classical (Columnar) and Free Verse poetry
Week 9	Grammatically correct usage and writing of numbers
Week 10	Biography and literary contribution of the poet Hafez Ibrahim
Week 11	Biography and literary contribution of the poet Badr Shakir al-Sayyab
Week 12	Biography and literary contribution of the poet Al-Jawahiri
Week 13	Identifying and extracting Hamzat al-Qat' from texts
Week 14	Correct usage of Hamzat al-Wasl in writing
Week 15	Constructing sentences from (Al-Mubtada' wa Al-Khabar)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1- **Aliwi, S. H.** (2015). Al-Nahw al-Wasit (Intermediate Grammar). 1st ed. Amman, Jordan: Dar Safaa for Publishing and Distribution. 2- **Ibn Aqil.** (2006). Sharh Ibn 'Aqil on Alfiyyat Ibn Malik. 1st ed. Beirut, Lebanon: Dar Al-Kotob Al-Ilmiyah. 3- **Dayf, S.** (2006). History of Arabic Literature. 2nd ed. Cairo, Egypt: Dar Al-Ma'aref.	Yes
Recommended Texts	1. **Al-Ansari, I. H.** (2009). Sharh Qatr al-Nada wa Ball al-Sada. 1st ed. Beirut, Lebanon: Dar Al-Hilal for Publishing and Distribution. 2. **Al-Samarrai, F. S.** (2017). Meanings of Grammar (Ma'ani al-Nahw). Beirut, Lebanon: Dar Ibn Kathir for Publishing and Distribution.	No
Websites	Wikipedia ,Arabic Language Forums	

Grading Scheme

Group	Grade	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Engineering Drawing and Auto-CAD II**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE1211**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	١٥٠			☐ **Tutorial**	
				☒ **Practical**	
				☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Mohanad Jaber Yasir		**e-mail**	msb.mohanad.Yasir@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1)Develop proficiency in *technical communication* and production of mechanical engineering drawings. 2)Develop skills in the preparation of working and assembly mechanical drawings. 3)*Develop an understanding of the properties, uses and production of materials used in the* manufacture of engineering components. 4)Provide knowledge of the different methods of production of engineering components. 5)*Develop skills in communicating technical information using illustrations, scaled models and working drawings* to solve engineering *design* problems. 6)Develop skills in applying and drawing principles to facilitate product development and manufacture. 7)Develop *proficiency* in the use of Computer-Aided Drafting (CAD) software, *instruments, media and reference materials* to produce engineering drawings. *8)*Develop an interest in mechanical engineering as disciplines and careers. *9)Develop the capacity for critical and creative thinking, problem-solving, leadership and cooperative behaviors through authentic learning experiences.*
Module Learning Outcomes	• Know how to represent solids in pictorial projections. • Know how to produce working and assembly drawings.

	• Know how to use Computer-Aided Drafting software to produce drawings (different three-dimensional figures "solid figures"). • Know how to project auxiliary views. • Know how to prepare drawings with sectional views.
Indicative Contents	**Indicative content includes the following**.[150] • Represent solids in pictorial projections. [20 hrs.] • Assembly drawings. [40 hrs.] • Project auxiliary views. [20 hrs.] • Prepare drawings with sectional views. [30 hrs.] • Computer-Aided Drafting software (three-dimensional figures). [40 hrs.]

Learning and Teaching Strategies	
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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	80	**Structured SWL per Week (h/w)**	6
Unstructured SWL per Semester (h/sem)	70	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	١٥٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	5% (20)	5 and 10	LO #2, #4, and two in #5
	Class Assignment	15	1.5% (22.5)	Continuous	All
	Home work	15	0.5% (7.5)	Continuous	LO #3, #5 and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 2	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 3	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 4	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 5	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 6	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 7	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 8	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 9	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 10	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).

Week 11	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 12	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 13	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 14	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 15	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 2	Represent solids in pictorial projections, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 3	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 4	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 5	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 6	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 7	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 8	Assembly drawings, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 9	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 10	Project auxiliary views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 11	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 12	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 13	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 14	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).
Week 15	Prepare drawings with sectional views, Computer-Aided Drafting software to produce drawings (three-dimensional).

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Engineering drawing, Abdul Rasoul Al Khafaf, University of Technology, Baghdad, Iraq, 1990.	Yes
Recommended Texts	Handbook of engineering drawing and AutoCAD, Mohammad Abid Muslim Altufaily, University of Babylon, Iraq, 2007	Yes
Websites	https://youtu.be/eIPHvDcMx-w	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors

	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Engineering Mechanics**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE1202**			☐ **Lecture**	
ECTS Credits	٦			☐ **Lab**	
SWL (hr/sem)	١٥٠			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Bashar Abid Hamza		**e-mail**	met.basher.abid@uobabylon.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	After completing the course, students should be able to 1. Describe the characteristics and properties of forces and moments, analyze the force system, and obtain the resultant and equivalent force systems, 2. State the conditions of equilibrium, draw free body diagrams (FBDs), analyze and solve problems involving rigid bodies in equilibrium, 3. Draw FBDs, analyze and solve structural and mechanical systems of rigid bodies in equilibrium, 4. Draw FBDs, analyze and solve structural and mechanical systems with distributed loads in equilibrium, 5. Describe the mechanism and characteristics of dry friction, draw FBDs, analyze and solve structural and mechanical systems with friction in equilibrium, 6. Describe the physical meanings of idealized problems in Statics and approximate real-life Situations to idealized problems 6- Describe the equation of kinematics and solve problems. 7- Describe and analysis the equation of kinetics and solve problems.
Module Learning Outcomes	1- To understand Principal engineering mechanics 2- enable student to study and analyze force systems 3- enable student to Modeling of supports and free body diagram 4- Enable student to study equilibrium of force systems applied on bodies. 5- Enable student to locate the centroid of area. 6- Enable student to determine the moment of inertia of area. 7- Enable student to analyze and solve structural and mechanical systems with friction in equilibrium. 8- Enable student to compare between kinematics and kinetics of particles 9- Enable student to study and analysis kinematics (rectilinear/curvilinear motion). 10 - Enable student to study and analyze the kinetics of particles (equation of motion, work and energy, and impulse and momentum)
Indicative Contents	**Indicative content includes the following**. • Introduction, perpendicular components of forces, moment and couple of forces and resultant of force system. **[١٦hrs.]** • Modeling of supports, Draw free body diagram. **[٥hrs.]** • Determination Centroid of lines, area, and volume using integration. **[٥hrs.]** • Determination Centroid of lines, area, and volume using tables. **[٣hrs.]** • Determination moment of inertia using integration. **[٣hrs.]** • Determination moment of inertia using tables. **[٣hrs.]** • Evaluation of friction forces. **[٥hrs.]**

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	٦٤	**Structured SWL per Week (h/w)**	٤
Unstructured SWL per Semester (h/sem)	٨٦	**Unstructured SWL per Week (h/w)**	٦

Total SWL per Semester (h/sem)	١٥٠

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	2 and 4	LO #1 and #2
	Assignments	2	5% (5)	4 and 8	LO #1 - #5
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2hr	30% (30)	4 and 8	LO #1 - #5
	Final Exam	٣hr	40% (40)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction
Week 2	Force 2D (perpendicular components)
Week 3	Force 2D (moment and couple)
Week 4	Force 2D (resultant)
Week 5	Equilibrium
Week 6	Centroid lines, area, and volume
Week 7	Centroid lines, area, and volume
Week 8	Moment of inertia
Week 9	Moment of inertia
Week 10	Friction
Week 11	Dynamics –Kinematics of particles – (1) –Rectilinear motion
Week 12	(2) Curvilinear Motion
Week 13	Kinetics of Particles – (1) Equation of Motion
Week 14	(2)- Work and Energy
Week 15	3- Impulse and Momentum.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	J. L. Meriam and L. G. Kraige, 'Engineering Mechanics: Statics (V.1), 7th edition, Wiley 2012.	Yes
Recommended Texts	R. C. Hibbeler, Engineering Mechanics: STATICS (SI Edition), 14th edition, Prentice Hall 2016.	No
Websites		

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

	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information			
Module Title	**Mathematic II**	**Module Delivery**	
Module Type	**S**	☒ **Theory**	
Module Code	**ENM1213**	☐ **Lecture**	
ECTS Credits	**6**	☐ **Lab**	
SWL (hr/sem)	**150**	☒ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Mohammed Abd Aldeem	**e-mail**	met.moh.abdaldaaem@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	Mathematic I	**Semester**	One
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	After completing the course, students should be able to: 1) Enable the pupil to learn the concepts of mathematics and applications in his work. 2) To study the Definite Integrals, Properties of definite integrals. 3) To understand methods of integrations: Integration by parts, by Tabular, by Partial Fractions.

	4) Study the applications of the definite integral: 1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate. 5) To understand the Numerical methods for evaluating definite integrals: I- Trapezoidal rule, II-Simpson's rule. 6) Study the Sequences: convergent sequence: Limits that arise frequently. 7) Study the infinite series: converges series, diverges series, Kind of series: 1-Geometric Series, P-Series. 8) To knows the Tests for converges of series:1-Integral Test, 2-Ratio Test, 3-RootTest, Taylor and Maclaurin series.

Module Learning Outcomes	1) Describe the characteristics and Properties of definite integrals. 2) Describe and State the concept of methods of integrations: Integration by parts, by Tabular, by Partial Fractions. 3) To understands the applications of the definite integral: 1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate. 4) To knows the meaning of the Numerical methods for evaluating definite integrals: i) Trapezoidal rule, ii) Simpson's rule. 5) Describe the Sequences: convergent sequence: Limits that arise frequently. 6) Describe the Infinite series: converges series, diverges series, Kind of series: 1-Geometric Series, 2- P-Series. 7) Describe the Unit vector, vector equation, cross product, dot product. 8) To understands the Tests for converges of series: 1-Integral Test, 2-Ratio Test, 3-RootTest, to knows the meaning of Taylor and Maclaurin series.
Indicative Contents	**Indicative content includes the following**. • Integration: Definite Integrals, Properties of definite integrals, Methods of integrations: Integration by parts, by Tabular, by Partial Fractions, Integration by reduction formulas, Integrating powers, Integration by Trigonometric Substitutions, Integration of irrational function, Integration of rational function of Trigonometric, Applications of the definite integral:1- Area under the curve, 2- Area between two curves, 3-Area in polar co-ordinate. [20 hr] • 4-Volumes By Disks: i) around $x-axis$, ii) around $y-axis$, 5- Volumes by Washers: i) around $x-axis$, ii) around $y-axis$, 6- Volumes by Cylindrical Shells: i) about $x-axis$, ii) about $y-axis$, Volume in polar co-ordinates system, Length of a plane curve, Area of a surface of revolution, Area of the surface in polar co-ordinates system. [20 hr] • Area of a surface of revolution, Area of the surface in polar co-ordinates system, Multiple Integrals: Double Integrals, Triple Integrals, Numerical methods for evaluating definite integrals: i) Trapezoidal rule, ii) Simpson's rule, Sequences: convergent sequence: Limits that arise frequently, Infinite series: converges series, diverges series, Kind of series:1-Geometric Series, P-Series, Tests for converges of series:1-Integral Test, 2-Ratio Test, 3-RootTest, Taylor and Maclaurin series. [20 hr]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	86	**Unstructured SWL per Week (h/w)**	6
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7,#8
	Projects				
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Integration: Definite Integrals, Properties of definite integrals.
Week 2	Methods of integrations.
Week 3	Methods of integrations.
Week 4	Methods of integrations.
Week 5	Applications of the definite integral.
Week 6	Volumes By Disks.
Week 7	Volumes By Washers. (mid-term Exam)
Week 8	Volumes By Cylindrical Shells.
Week 9	Volume in polar co-ordinates system, Length of a plane curve.
Week 10	Area of a surface of revolution, and in polar co-ordinates system.
Week 11	Multiple Integrals.
Week 12	Numerical methods for evaluating definite integrals.
Week 13	Sequences.
Week 14	Infinite series.
Week 15	Taylor and Maclaurin series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr, Weir Joel R. Hass ‘Calculus’ (V.12), 2014**.**	Yes
Recommended Texts	1. Haward Anton" Calculus and analytic geometry". 2. Schaum’s series “Theory and problems of calculus”.	No
Websites		

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

Fail Group (0 – 49)	**FX** – Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Manufacturing Processes & Engineering Workshop**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE1203**			☐ **Lecture**	
ECTS Credits	**4**			☐ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial**	
				☒ **Practical**	
				☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**		Two	
Administering Department	Energy Engineering	**College**		College of Engineering\Al-Musayab	
Module Leader	Ahmed Saad Jasim	**e-mail**		ahmed.saad.jas@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Lecture	**Module Leader's Qualification**		M.Sc.	
Module Tutor	None	**e-mail**		E-mail	
Peer Reviewer Name	None	**e-mail**		E-mail	
Scientific Committee Approval Date	01/09/2024	**Version Number**		1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) To study the machining operations and machine tools that include: turning and related operations, drilling and related operations, milling, grinding and other abrasive processes, and other machining operations.

	2) To understand the bulk deformation processes in metal working that include: rolling and related operations, forging and related operations, extrusion, and wire and bar drawing and also study the sheet metal working / cutting operations, bending operations, and drawing. 3) Study the joining and assembly processes that include: fundamentals of welding, arc welding, resistance welding, oxyfuel gas welding, soldering, and brazing. 4) To learn the fundamentals of metal casting, and metal casting processes.

Module Learning Outcomes	**1.** Describe turning and related operations **2.** Learn drilling and related operations **3.** Give information about milling **4.** Define grinding and other abrasive processes **5.** Give information about other machining operations: shaping and planning, broaching, and sawing **6.** Know the rolling and related operations **7.** Learn about of forging and related operations **8.** Give information about extrusion **9.** Study wire and bar drawing **10.** Give information about sheet metal working / cutting operations, bending operations, and drawing **11.** Define fundamentals of welding **12.** Know the arc welding **13.** Define resistance welding, and ox fuel gas welding **14.** Study soldering, and brazing **15.** Give information about fundamentals of metal casting, metal casting processes.
Indicative Contents	**Indicative content includes the following**. • Study the machining operations and machine tools that include: turning and related operations, drilling and related operations, milling, grinding and other abrasive processes, and other machining operations. [20 hr]. • Study the bulk deformation processes in metal working that include: rolling and related operations, forging and related operations, extrusion, and wire and bar drawing and also study the sheet metal working / (1) cutting operations, (2) bending operations, (3) drawing. [20 hr] • Study the joining and assembly processes that include: fundamentals of welding, arc welding, resistance welding, oxyfuel gas welding, soldering, and brazing. [16 hr] • study the fundamentals of metal casting, and metal casting processes. [4 hr]

Learning and Teaching Strategies	
Strategies	Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success. After considering students' needs, learning styles.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	36	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**100**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (15)	5, 10, and14	LO #1- #4, #5 - #9 and #10 - #13
	Assignments	2	10% (10)	6 and 11	LO #1 - #5 and #6 - #10
	Report	1	5% (5)	13	All
	Practical	1	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	11	LO #1 - #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Turning and Related Operations
Week 2	Drilling and Related Operations
Week 3	Milling
Week 4	Grinding and Other Abrasive Processes
Week 5	Other Machining Operations : (1) shaping and planning, (2) broaching, and (3) sawing
Week 6	Rolling and Related Operations
Week 7	Forging and Related Operations
Week 8	Extrusion, Wire and Bar Drawing
Week 9	Wire and Bar Drawing
Week 10	Sheet Metal Working / (1) Cutting Operations, (2) Bending Operations, (3) Drawing
Week 11	Fundamentals of Welding – (mid-term Exam)
Week 12	Arc welding
Week 13	Resistance welding, Oxyfuel gas welding
Week 14	Soldering, Brazing
Week 15	Fundamentals of Metal Casting, Metal Casting Processes
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	A) The turning workshop consists of training its students on: 1) Listed work (adjusting the correct measurements for different diameters and lengths using a triangle turning pen).
Week 2	2) Make the arches (it should be on the same piece as the first exercise, after adjusting it and making sure of the measurements according to the drawing in the first exercise).
Week 3	3) Making different angles (introducing the student to the use of shaping pens (square pen, corner pen 55)).
Week 4	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 5	B) The filling workshop consists of training its students on: 1) Filling flat surfaces and filling straight and inclined angles
Week 6	2) Sawing and sawing process
Week 7	3) Hand Drills and Vertical Stationary Drills (How to Operate and Use)
Week 8	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 9	C) The welding workshop consists of training its students on various welding methods, such as: 1) Manual arc welding: a) Training on how the electric arc works and occurs between two electrodes.

Week 10	b) Training on how to make welding lines straight.
Week 11	c) Training on how to weld the construction exercise (increasing the thickness of the piece).
Week 12	2) Gas welding (oxy-acetylene)
Week 13	3) Electric arc welding protected by inert gas represented by gases such as argon and carbon dioxide, where argon gas is used with tungsten electrode welding machines (T.I.G) and CO2 gas with machines (M.I.G).
Week 14	4) Electrical resistance welding, specifically spot welding.
Week 15	Exam: A test was conducted for the student on what he learned in the theoretical and practical aspects
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	[1] Groover, Mikell P. ***Fundamentals of modern manufacturing: materials, processes, and systems.*** John Wiley & Sons, 2020.	No
Recommended Texts	None	No
Websites	[1]https://books.google.com/books?hl=ar&lr=&id=mB7zDwAAQBAJ&oi=fnd&pg=PA1&dq=FUNDAMENTALS+OF+MODERN+MANUFACTURING+Materials,Processes,andSystems+Fourth+Edition&ots=H1hck34oBY&sig=os2Xrjr-16zwPs6JVbGDcG4fuy8	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information		
Module Title	**Chemistry**	**Module Delivery**
Module Type	**S**	☒ **Theory**
Module Code	**ERE1204**	☐ **Lecture**
ECTS Credits	**4**	☒ **Lab**
SWL (hr/sem)	**100**	☐ **Tutorial**
		☐ **Practical**

		☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	Two
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ali Jassim Al-Zuhairi	**e-mail**	met.ali.jassim@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) To develop problem solving skills and understanding of the quantitative analytical methods. 2) To understand acids, basis and salts. 3) This course deals with the basic concept of buffers. 4) This is the basic subject for all physical chemistry concepts. 5) To understand ideal gas law. 6) To perform the thermochemistry.
Module Learning Outcomes	1. The students will know the principle of analytical chemistry. 2. List the quantitative and qualitative analysis. 3. Summarize what is meant by acids, basis and salts. 4. Discuss the titration curves. 5. Describe the principle of organic chemistry in terms of Alkan, alkenes and alkynes. 6. Identify the basic hydrocarbons by its nomenclature and reactions. 7. Explain the Ideal gas law. 8. Identify the enthalpy of a chemical reaction.
Indicative Contents	**Indicative content includes the following**. • Introduction of Analytical Chemistry and its types**,** The principle of Volumetric analysis, Moler, Normal and formal concentration, Acid Base titrations, Buffers and Titration Curves, Oxidation-Reduction reactions, Precipitation reactions. [20 hrs] • Organic chemistry (Introduction), The Alkanes, Alkanes reactions and Alkenes. [15 hrs] • Alkenes reactions, Alkynes and Alkynes reactions. [15 hrs] • Ideal gas low, Boyle's law, Charles's law, thermochemistry, Energy sources. [10 hrs]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	٦٤	**Structured SWL per Week (h/w)**	٤
Unstructured SWL per Semester (h/sem)	٣٦	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**100**		

Module Evaluation					
		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**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction - Analytical Chemistry and its types
Week 2	The principle of Volumetric analysis
Week 3	Moler, Normal and formal concentration
Week 4	Acid Base titrations
Week 5	Buffers
Week 6	Review of Titration Curves
Week 7	Mid-term Exam
Week 8	Oxidation-Reduction reactions
Week 9	Alkanes reactions
Week 10	Alkenes reactions
Week 11	Alkynes reactions
Week 12	Aldehydes and aketons
Week 13	Carboxylic acids reactions
Week 14	Ideal gas low and Boyle's law
Week 15	Thermochemistry and Energy sources
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Acid- Base titration
Week 2	Lab 2: Reduction - Oxidation titration
Week 3	Lab 3: Precipitation titration
Week 4	Lab 4: Complex metric titration
Week 5	Lab 5: Determination the density of a liquid
Week 6	Lab 6: Determination of Calorimetric Constant
Week 7	Lab 7: Determination the Viscosity of a pure liquid

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	General Chemistry; Darrell D. Ebbing; Steven D. Gammon	no
Recommended Texts		
Websites	https://books.google.iq/books?id=BnccCgAAQBAJ&printsec=frontcover&redir_esc=y#v=onepage&q&f=false	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information				
Module Title	**English language I**		**Module Delivery**	
Module Type	**B**		☒ **Theory**	
Module Code	**UOBABb1101**		☐ **Lecture**	
ECTS Credits	٤		☐ **Lab**	
SWL (hr/sem)	١٠٠		☐ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**		Two
Administering Department	Energy Engineering	**College**		College of Engineering\Al-Musayab

Module Leader	Rusul Dawood Salman	**e-mail**	met.rusul.dawood@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.A.
Module Tutor	-	**e-mail**	-
Peer Reviewer Name	-	**e-mail**	-
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) Developing skills of reading, writing, speaking and listening. 2) Providing a survey of theoretical perspectives concerning the student's learning and development. 3) Providing an overview of a variety of important issues in English language that help the students to communicate easily with others. 4) Applying the theoretical issues in order to give the student the opportunity to practice language and encourage him to speak with foreign people. 5) Giving the students the ability to express their opinions and participating in discussion. 6) Using variety of digital devices and tools in order to interpret and create meaning.
Module Learning Outcomes	1. The ability to understand the uses of language in the light of purposes. 2. Identifying the most important daily phrases to be applicable in life. 3. Development of evidence-based arguments. 4. Making the students aware of the correct usages of English grammar in writing and speaking. 5. Improving the students' ability in English in terms of fluency and comprehensibility. 6. Students will give oral presentation and receive feedback on their performance. 7. Improving the students' reading skills through the extensive reading. 8. Providing the students with a large repertoire of vocabulary. 9. Applying the grammatical forms in communicative contexts such as: class activities, reading & writing, and homework. 10. Strengthening the students' ability to write essays and academic papers. 11. Enhancing the students' competence in four important elements: Writing. speaking, reading and listening.
Indicative Contents	**Indicative content includes the following**. • Focusing on four important issues in English language: Writing, speaking reading and listening [15 hrs] • Understanding the general topic or main idea, major points, important facts and details, vocabulary in context, and pronoun references. [15 hrs] • Comprehending the main idea, major points, and important details related to the main idea. [10 hrs] • Students should be able to speak successfully in and outside the classroom. [15 hrs] • [6 hrs] Part B - Analogue Electronics Fundamentals • Recognizing tenses choosing the correct form, arranging the sentences in the correct order, [15 hrs] • Covering aspects such as phonetics, semantics and pragmatics. [7 hrs]

	• Exploring the building blocks of the language, understanding language in deeper level, learning how to structure words and sentences so that other people can understand them. [15 hrs]

Learning and Teaching Strategies	
Strategies	Student is an essential part of the process thus we should take into consideration the levels of student's' comprehension whence providing him with better and easier planning, improved ability to monitor student's goals, teaching language skills across all curriculum topics, speaking slowly and allowing extra time for students to respond, using a variety of methods to engage learning.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	٣٣	**Structured SWL per Week (h/w)**	٢
Unstructured SWL per Semester (h/sem)	٦٧	**Unstructured SWL per Week (h/w)**	٤
Total SWL per Semester (h/sem)	١٠٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	20% (20)	5 and 13	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction – Giving a general information about English Language
Week 2	Speaking (paired choice) asking about the general opinions about possible issues
Week 3	Speaking (campus announcement & general conversation) report on the speaker's opinion & explain why he/she feels that way
Week 4	Integrated speaking (Academic reading & Lecture) explaining the academic topics & describing the main points in it.
Week 5	Listening to engineering conversation to obtain a wide vocabulary
Week 6	Listening to various videos concerning the engineering fields as: (Mechanical engineering, electrical engineering in addition to renewable energies).
Week 7	**Mid-term Exam**
Week 8	Writing (learning students how to write essays on engineering field)
Week 9	Writing (enabling students to write their opinion about specific academic topic in general or write about engineering subject in particular).
Week 10	Speaking (making the students sum up the main points of the lecture that is delivered previously)
Week 11	Speaking (increasing the student' ability to speak fluency and increasing its rate)
Week 12	Listening (encourage the student to make inferences from what he/she heard before)
Week 13	Listening (ask the student what the speaker imply in his/her speech)
Week 14	Writing (ask student to write the essential information in the highlighted sentences in paragraph and make paraphrasing in to those sentences)
Week 15	Witting (encourage student to extract the most important issues in paragraph)

Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	TOEFL Practice Online The official practice test that can help you go anywhere	No
Recommended Texts	The Cambridge Encyclopedia of the English Language By David Crystal	No
Websites	https://www.cambridge.org./	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information				
Module Title	**Human Rights and democracy**		**Module Delivery**	
Module Type	**B**		☒ **Theory**	
Module Code	**UOBAB1104**		☐ **Lecture**	
ECTS Credits	**2**		☐ **Tutorial**	
SWL (hr/sem)	**50**		☐ **Practical**	
			☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	Two	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Abd Alkhaliq Mahdi	**e-mail**	abdkhaliqmahdi@uobabylon.edu.iq	

Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	2.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Enhancing students' understanding of the conceptual theoretical dimensions and historical development of Human Rights and Democracy. 2. Developing students' ability to critically analyze the current state and future prospects of human rights and democratic practices. 3. Training students on the importance of active participation in public life, promoting respect for human rights, and engaging effectively in political and cultural spheres. 4. Empowering students to understand the role of education in spreading a culture of democracy and building a civilized society based on good governance, human rights advocacy, and free and fair elections.
Module Learning Outcomes	1. Students will acquire a comprehensive understanding of the laws and fundamental principles of human rights throughout the academic year. 2. Preparing a socially conscious generation with a deep understanding of human rights issues and responsibilities. 3. Consolidating the concepts of rights and democracy among students and promoting their dissemination within society. 4. Keeping students abreast of international experiences and familiarizing them with key global resolutions, conventions, and human rights instruments.
Indicative Contents	The importance of "Human Rights and Democracy" lies in enabling students to study the fundamental rights established in international norms and laws, as well as those rooted in Islamic Sharia and Iraqi constitutions, particularly the current 2005 Constitution. Furthermore, it provides students with essential knowledge of international human rights conventions. Additionally, the course familiarizes students with historical and contemporary democratic experiences to draw lessons and benefit from them.

Learning and Teaching Strategies	
Strategies	1) Daily discussions to assess student comprehension and evaluating their active participation. 2) Daily formative quizzes with diverse scientific questions to monitor students' understanding of the material. 3) Allocating a portion of the semester grade to homework assignments and independent tasks. 4) Evaluation based on regular quizzes, monthly exams throughout the curriculum, and a comprehensive final examination.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	19	**Structured SWL per Week (h/w)**	2
Unstructured SWL per Semester (h/sem)	50	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects				
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	2hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	The concept of human rights, its core characteristics, and distinctive features
Week 2	Human Rights in Ancient History
Week 3	Definition of legal personality and its key characteristics
Week 4	The stance of divine religions and Western civilizations toward human rights
Week 5	Sources of the International human rights
Week 6	National sources for human rights
Week 7	Global and regional mechanisms for protecting human rights – **Midterm Exam**
Week 8	National protection mechanisms and human rights guarantee in Islam
Week 9	Historical development of children's rights and their status in international agreements.
Week 10	Definition of democracy and its historical evolution
Week 11	Pillars of Democracy
Week 12	Democratic Elections
Week 13	Types of democratic governance systems
Week 14	The principle of the rule of law and the separation of executive, legislative, and judicial powers
Week 15	The impact of media and globalization on the field of human rights
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Dr. Hameed Hanoun Khalid, Human Rights.	Yes
Recommended Texts	Dr. Fakhri Rashid Al-Mihna and Dr. Salah Yassin Dawood, International Organizations, University of Mosul.	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group	**A –** Excellent	90 – 100	Outstanding Performance

(50 - 100)	**B -** Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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.

Second Stage\2025

Module Information			
Module Title	**Thermodynamics I**	**Module Delivery**	
Module Type	**S**		☒ **Theory**
Module Code	**ERE2311**		☐ **Lecture**
ECTS Credits	**6**		☒ **Lab**
SWL (hr/sem)	١٥٠		☒ **Tutorial**
			☐ **Practical**
			☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	Three
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ali Jaber Abdulhamed	**e-mail**	msb.ali.jaber@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
	1) To develop problem solving skills and understanding of pure substance. 2) To understand behavior of Ideal gases. 3) To develop problem solving skills and understanding of IC engine cycles.

Module Objectives	4) To develop problem solving skills and understanding of heat, work and the relation between it. 5) To develop problem solving skills and understanding of 1st law of thermodynamics. 6) To develop problem solving skills and understanding of 1st law on closed system. 7) To develop problem solving skills and understanding of 1st law on open system.

Module Learning Outcomes	1. Know how to use the thermodynamic tables. 2. Recognize how pure substance works in system. 3. Recognize between pure substance and ideal gases. 4. Recognize between air standard Otto, Diesel, and Dual cycles. 5. Know the relations between heat and work. 6. Know the energies as Kinetic, potential, enthalpy and internal energy. 7. Know the 1st law of thermodynamics. 8. Recognize between open and close systems.
Indicative Contents	**Indicative content includes the following**. • Introduction, Definition, Force, pressure, Energy, resources, Heat, work, power, Internal energy, enthalpy, 0th law, Temperature, and its measurement, thermodynamics properties, liquid-vapor relations. **[20 hrs]** • Ideal gases, efficiency analysis for IC engines. **[15 hrs]** • First law of thermodynamics/perpetual motion machine; Equation of state, closed-system processes, constant volume pressure and processes, open -system processes. **[20 hrs]** • Adiabatic and polytrophic processes; Open -system processes, steady- flow energy equation. **[20 hrs]**

Learning and Teaching Strategies	
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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	79	**Structured SWL per Week (h/w)**	5
Unstructured SWL per Semester (h/sem)	71	**Unstructured SWL per Week (h/w)**	5
Total SWL per Semester (h/sem)	١٥٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (20)	5 and 10	LO #1 - #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	11	LO #3, #5 and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #4
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Some Concept and Definitions
Week 2	Properties of Pure Substances

Week 3	Thermodynamics Tables
Week 4	Ideal Gases
Week 5	Air-standard Otto Cycle
Week 6	Air-standard Diesel Cycle
Week 7	The Work Type (W)
Week 8	Thermodynamic work
Week 9	Mid-term Exam
Week 10	Heat Transfer in Control mass system
Week 11	The 1st Law of Thermodynamic - Heat Transfer, enthalpy, and internal Energy
Week 12	Close system processes
Week 13	Open system processes
Week 14	The 1st Law of Thermodynamic in Turbine, Compressor, Boiler, Condenser
Week 15	The 1st Law of Thermodynamic in, pipe, Duct, valves, Mixing Chamber
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Calculate the dryness fraction for wet steam
Week 2	Lab 2: Find the pressure curve for steam
Week 3	Lab 3: Verification of Boyle's law.
Week 4	Lab 4: Verification of Charles's law
Week 5	Lab Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamental of Classical Thermodynamics / Van Wylen	Yes
Recommended Texts	Thermodynamics: An Engineering Approach / Yunus Cengel	Yes
Websites	https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Thermodynamics%3A+an+Engineering+Approach&btnG=	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Fluid Mechanics I**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2312**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Three		
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Sanaa Abdulrazaq Jassim	**e-mail**	met.sanaa.abd@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	PhD		
Module Tutor		**e-mail**			
Peer Reviewer Name	None	**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) To study the fluid mechanics science. and why study fluid mechanics. and to understand fluid properties. 2) To learn fluid properties. 3) Study the fluid in static condition, pressure of fluid, pressure units and gages. 4) Study the forces acting on bodies immersing and floating in fluids, stability and relative equilibrium of them. 5) To understand testing of fluids, viscosity, type of pressure gauges, hydrostatic pressure measurement, stability of body floating in liquid, proving Bernoulli's equation. 6) To learn fluid in dynamic equations.
Module Learning Outcomes	1. To understand Fluid properties, Newton's law of Viscosity, Kinematic viscosity Bulk Modulus of elasticity, and Surface tension. Describe basic definition and conception of Fluid Statics, Pressure at a point, - Variation of Pressure in a static fluid. 2. Approve Hydrostatic laws, and learn about units and scales of Pressure measurement, and types of Manometers. 3. Calculate Force on plane and curved surfaces. 4. Define buoyant force, and describe Stability of floating and submerged bodies.

	5. Understand relative equilibrium (linear acceleration), and relative equilibrium (uniform rotation) 6. Define Fluid flow concepts and Basic Equations. 7. Continuity equation. 8. Euler's equation of motion along streamline. 9. Bernoulli equation. 10. With regard to the practical side, the program aims to familiarize students with experiments related to viscosity measurement and identification of pressure measuring devices in addition to measuring hydrostatic pressure and equilibrium of floating and submerged bodies in fluids.
Indicative Contents	**Indicative content includes the following**. • Introduction of fluid mechanic science, and why study fluid mechanics, and to understand fluid properties. Also to learn static fluid mechanics. [15 hrs]. • Study the Pressure at a point, - Variation of Pressure in a static fluid. Hydrostatic laws, units and scales of Pressure measurement, and types of Manometers. [15 hrs] • Calculate Force on plane and curved surfaces. Buoyant force, and Stability of floating and submerged bodies. Understand relative equilibrium (linear acceleration), and relative equilibrium (uniform rotation). [25 hrs]. • Define Fluid flow concepts and Basic Equations. Continuity equation. Euler's equation of motion along streamline. Bernoulli equation. [20 hrs].

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	79	**Structured SWL per Week (h/w)**	5
Unstructured SWL per Semester (h/sem)	71	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		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%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Fluid properties, General definitions, - Newton's law of Viscosity, - Kinematic viscosity
Week 2	Bulk Modulus of elasticity, Surface tension
Week 3	Fluid Statics, Definitions, Pressure at a point, - Variation of Pressure in a static fluid
Week 4	Hydrostatic laws, Units and scales of Pressure measurement

Week 5	Manometers (Pressure Measurement)
Week 6	Force on plane surfaces
Week 7	Force on curved surfaces – (Mid-term Exam)
Week 8	Buoyant force
Week 9	Stability of floating and submerged bodies
Week 10	Relative equilibrium (linear acceleration)
Week 11	Relative equilibrium (uniform rotation)
Week 12	Fluid flow concepts and Basic Equations, Definitions
Week 13	Continuity equation
Week 14	Euler's equation of motion along streamline
Week 15	Bernoulli equation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	None
Week 2	Experiment 1: Measurement of viscosity
Weeks 3-4	None
Week 5	Experiment 2: identifying pressure gauges and manometers
Week 6	Experiment 3: Hydrostatic pressure
Weeks 7-9	None
Week 10	Experiment 4: Metacentric height

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Frank M. White, Fluid Mechanic, fifth ed.,	Yes
Recommended Texts	1- A Textbook of Fluid Mechanics and Hydraulic Machines. Ninth ed. 2010 2- FLUID MECHANICS FOR ENGINEERS, 2011	No
Websites	https://www.infobooks.org/free-pdf-books/engineering/fluid-mechanics/ https://www.academia.edu/20207960/Fluid_Mechanics_Textbook	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Engineering Mathematics**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2313**			☐ **Lecture**	
ECTS Credits	**6**			☐ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Three		
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Mohammed Ali Mohammed	**e-mail**	msb.mohammed.ali@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Lecture	**Module Leader's Qualification**	M.Sc.		
Module Tutor		**e-mail**			
Peer Reviewer Name	None	**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules			
Prerequisite module	Mathematics	**Semester**	1
Co-requisites module	Applied Mathematics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Understanding the basic concepts of calculus, differential equations, and linear algebra. 2. Applying mathematical principles to solve engineering problems. 3. Developing skills in mathematical modeling and simulation. 4. Understanding the role of mathematics in engineering design and analysis. 5. Developing critical thinking and problem-solving skills. 6. Developing effective communication skills in mathematics. 7. Understanding the importance of mathematical accuracy and precision in engineering.
	1. Understanding the concept of vectors and their representation in two and three dimensions. 2. Being able to perform vector operations such as addition, subtraction, scalar multiplication, dot product, and cross product. 3. Understanding the concept of periodic functions and their representation using Fourier series. 4. Learning the techniques to calculate Fourier coefficients and Fourier series.

Module Learning Outcomes	5. Applying Fourier series to solve problems in signal processing, heat transfer, and wave propagation. 6. Understanding the concept of Fourier transform and its applications. 7. Understanding the properties of Fourier transform, such as linearity, time shifting, and frequency shifting 8. Understand the basic concepts and terminology of differential equations. 9. Solve first-order differential equations using various techniques such as separation of variables, integrating factors, and exact equations. 10. Solve second-order differential equations with constant coefficients using various techniques such as characteristic equations and undetermined coefficients. 11. Solve higher-order differential equations and systems of differential equations. 12. Understanding the concept of Laplace transform and its application in solving differential equations. 13. Ability to transform time-domain signals into frequency-domain signals using Laplace transform. 14. Understanding the properties of Laplace transform, such as linearity, time shifting, differentiation, integration, convolution, and initial and final value theorems. 15. Understanding the concepts of sequences and series, including arithmetic and geometric sequences, and the sum of a finite and infinite series. 16. Solving problems involving sequences and series, such as finding the nth term, the sum of the first n terms, and the limit of a sequence.
Indicative Contents	**Indicative content includes the following**. • Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations. Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector. [8 hrs] • **Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering. **Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications. [16 hrs] • **Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point. **Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations. [20 hrs] • **Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.[12 hrs] • **Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series. [4 hrs]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4

Unstructured SWL per Semester (h/sem)	86	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		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)	3 and 12	LO #3, #4 and #6, #7
	Projects	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%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations.
Week 2	**Vector Analysis**: Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector**.**
Week3& 4	**Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering.
Week 5&6	**Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications.
Week 7&8	**Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point.
Week 9 & 10& 11	**Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations
Week 12 &13&14	**Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.
Week 15	**Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	***Advanced Engineering Mathematics (Muhadharaty)***	No
Recommended Texts	Engineering-mathematics-ii-2009-cuppy	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**

Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2304**			☒ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial**	
				☐ **Practical**	
				☒ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Bashar Abid Hamza		**e-mail**	met.basher.abid@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Engineering Mechanics (Statics)	**Semester**	Two
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Introducing the concept of strength of materials. 2. learning the principles of stress and the associated strain 3. Studying the different types of deformations
Module Learning Outcomes	1. reviewing some of the important principles of statics 2. introducing the concepts of normal and shear stress and the associated strain 3. discussing the relation between stress and strain for materials that are commonly used in engineering 4. learning how to determine deformation of members subjected to axial loading with and without change in temperature 5. discussing the stress and deformation of shafts or tubes that are subjected to torsion 6. establishing the shear and moment diagrams in beam under bending then computing the stresses and the associated deformation 7. reviewing and combining stresses learned previously and finding the state of stress 8. showing how to transfer the state of stress into coordinate associated with different orientation 9. computing the deformation (deflection and slope) of beams
Indicative Contents	Part 1: structured SWL • Simple Stress: normal stress, shear stress, shear stress equilibrium, bearing stress, allowable stresses (12 h) • stress strain relations: normal strain, shear strain, normal stress strain diagram, hooks law, Poisson ratio, shear stress strain diagram (6 h) • Axial loading: deformation of axial members, statically indeterminate axial loaded members, thermal stresses. (6 h) • Torsion: shear stress in circular shafts, angle of twist, statically indeterminate torque loaded members. (6 h) • Shear and moment diagrams: equation method of establishing shear force and bending moment diagrams for beams, graphical method of constructing shear and moment diagrams (12 h) • Stresses in beams: bending stress, transvers shear stress (12 h) • combined loading: thin-walled vessels, cylindrical vessels, spherical vessels, combined loading in members (12 h) • Stress transformation: equation method of stress transformation, Mohr's circle (12 h) • Deflection in beams: integration method, moment area method (12 h) Part 2: unstructured SWL • problem solving assignments: 10 assignment each contains 3 types of problems (fundamental problems, actual problem, conceptual problems) (38 h) • project problem: selecting, investigating, analysis, and reporting a problem related stress and strain analysis of engineering materials (18 h including 3 h seminar)

Learning and Teaching Strategies	
Strategies	The main strategy to deliver this module is by encouraging the students to actively participate in solving homework, prepare and take quizzes, and attend discussion groups. This strategy, besides understanding the material, will enhance the student critical thinking.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	94	**Structured SWL per Week (h/w)**	6
Unstructured SWL per Semester (h/sem)	56	**Unstructured SWL per Week (h/w)**	4

Total SWL per Semester (h/sem)	150

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 12	1,2,3 and 5,6
	Assignments	10	10% (10)	2,3,4,6,7, 10,11,13,14,15	1 through 9
	Laboratory	5	10% (10)	Continuous	1 through 9
	Projects /Report	1	10% (10)	15	7 through 9
Summative assessment	Midterm Exam	2hr	10% (10)	8	1 through 5
	Final Exam	3hr	50% (50)	16	1 through 9
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction, normal stress
Week 2	Shear stress, bearing stress, allowable stress
Week 3	Strain, stress strain relations
Week 4	Axial loading, thermal stress
Week 5	Torsion, angle of twist
Week 6	Shear force and bending moment diagrams
Week 7	Bending stress in beams
Week 8	Midterm Exam
Week 9	Shear stress in beams
Week 10	Thin-walled vessels
Week 11	Combined loading
Week 12	Stress transformation 1
Week 13	Stress transformation 2
Week 14	Deflections in beams 1
Week 15	Deflections in beams 2
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: tension test
Week 2	Lab 2: compression test
Week 3	Lab 3: stress strain relation
Week 4	Lab 4: single vs. double shear
Week 5	Lab 5: torsion test

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Mechanics of Materials by R. C. Hibbeler	Yes
Recommended Texts	Strength of Materials by Pytel and Singer	No

Websites	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Material Science**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2305**			☐ **Lecture**	
ECTS Credits	**4**			☐ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Three	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Maithem Hussein Rasheed		**e-mail**	met.maithem.hussiem@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) To study the engineering materials science, and why study engineering materials, and to understand classifications of Engineering Materials. 2) To learn crystal and no crystal structures and unit cell. 3) Study the direction of crystallography and miller indices. 4) Study the atomic packing factors., study the stress – strain curve, young 5) To understand testing of engineering materials, tension, compression, types of hardness methods. 6) to learn metallurgy engineering, phase equilibrium diagram, Fe- C diagram, heat treatments composite materials
Module Learning Outcomes	1. Explain importance of materials in materials science and engineering field. 2. Relate between material and engineering. 3. Classify materials according to their types. 4. Describe basic definition and conception of materials and physical properties of materials. 5. Follow new developments in materials application field. 6. Information about atomic structure, atomic bonds, crystal structure, crystal geometry and crystal defects. 7. Define structure of atoms. 8. Define space lattice, unit cell, crystal systems and Bravais lattice. 9. Calculate unit cells and volumetric, planar and linear density values in unit cell. 10. Describe crystal imperfections. 11. Give information about mechanical properties of materials. 12. Stress- strain curve. 13. Study the different hardness methods experiments and calculations. 14. Give information about metal, polymer, ceramic and composite materials and their properties which used in automobile industry. 15. Study the metallurgy engineering, phase equilibrium diagram, Fe- C diagram, heat treatments.
Indicative Contents	**Indicative content includes the following**. • Introduction of engineering materials science, and why study engineering materials, and to understand classifications of Engineering Materials. Also to learn crystal and no crystal structures and unit cell, and study the direction of crystallography and miller indices. Study the atomic packing factors. [15 hr.] • study the stress – strain curve, young modulus .and to understand testing of engineering materials, tension, compression, types of hardness methods (Brinell, Vickers, Rockwell). Average and standard deviation. [15 hr.] • Study the composite materials (matrix and reinforcement), ceramics materials, metal, polymer, ceramic and composite materials and their properties which used in automobile industry. • Study the metallurgy engineering, phase equilibrium diagram, Fe- C diagram, heat treatments. [15 hr.]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	33	**Structured SWL per Week (h/w)**	2
Unstructured SWL per Semester (h/sem)	67	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (15)	5 and 10	LO #1, #2 and #10
	Assignments	2	10% (15)	2 and 10	LO #3, #4 and #6, #10
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #14
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction of material science
Week 2	Classifications of engineering material
Week 3	Crystal and non-crystal structures
Week 4	Unit cell and atomic packing factor
Week 5	Direction of crystallography and miller indices
Week 6	Stress – strain curve, young modulus
Week 7	Mechanical properties of engineering material. (Mid-term Exam)
Week 8	Tension – compression tests.
Week 9	Hardness test, types of hardness methods.
Week 10	Composite materials
Week 11	Ceramic materials
Week 12	Non-destructive tests
Week 13	Metallurgy, metals and alloys
Week 14	phase equilibrium diagram, Fe-C phase diagram
Week 15	Heat treatments
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Materials Science and Engineering, William Callister, 2007	Yes
Recommended Texts	The science and engineering of materials, Donald Askeland 2005.	No

Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**English language II**			**Module Delivery**	
Module Type	**B**			☒ **Theory**	
Module Code	**UOBAB2302**			☐ **Lecture**	
ECTS Credits	**4**			☐ **Lab**	
SWL (hr/sem)	١٠٠			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Three	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Rusul Dawood Salman		**e-mail**	met.rusul.dawood@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.A.	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name	-		**e-mail**	-	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) Improving reading, writing, speaking, and listening abilities. 2) Presenting an overview of theoretical perspectives concerning the students' development and learning. 3) Giving the students a broad understanding of various crucial English language topics that facilitate easy communication with others. 4) Applying the theories into reality to allow the student to practice speaking with foreigners and to encourage him to do so. 5) Allowing students to participate in discussions and sharing their views. 6) Using a range of digital tools and devices to interpret and construct meaning.
Module Learning Outcomes	1-understanding how language is used in relation to its objectives. 2. Selecting the most essential everyday expressions that can be used in daily interactions. 3. Developing the arguments based upon realities. 4. Teaching the students how to use English grammar properly in speaking and writing. 5. Increasing the students' proficiency and comprehension of the English language. 6. Students will do an oral presentation and get comments on how they did. 7. Increasing the students' reading proficiency through in-depth reading. 8. Giving the students access to a wide variety of words. 9. Using the grammatical forms in communicative contexts including homework, reading, and writing assignments. 10. Improving students ' abilities to write essay and academic paper in a skillful way. 11. Improving students' proficiency in four
Indicative Contents	**Indicative content includes the following**. • Emphasizing the following four crucial English-language issues: speaking, reading, and listening; and [15 hrs] • comprehending the overall subject or main idea, major concepts, essential details, terminology used in context, and pronoun references. [15 hrs] • being able to understand the primary idea, important components, as well as essential information relevant to the main idea. [10 hrs] • Inside as well as outside of the classroom, students should be able to talk clearly. [15 hrs] <u>Part B - Analogue Electronics</u> Fundamentals • Learning tenses selecting the appropriate format, placing the sentences in the appropriate order, [15 hrs] • Covering aspects such as phonetics, semantics and pragmatics. [7 hrs] • Examining the language's grammatical foundations, developing a deeper knowledge of language, and learning how to organize words and sentences so that other people can understand them. [15 hrs]

Learning and Teaching Strategies	
Strategies	The student is a crucial component of the learning process, so we should consider his comprehension levels as the main concern by providing him with better and easier planning, improved ability to track student goals, teaching language skills across all curriculum topics, speaking slowly and giving students extra time to respond, and using a variety of methods to engage learning.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	٣٣	**Structured SWL per Week (h/w)**	٢
Unstructured SWL per Semester (h/sem)	٦٧	**Unstructured SWL per Week (h/w)**	٤
Total SWL per Semester (h/sem)	١٠٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	20% (20)	5 and 13	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	١hr	10% (10)	7	LO #1 - #7
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction – Giving a general information about English Language
Week 2	Speaking in classroom the student responds to questions & participate in academic discussions with other students
Week 3	Speaking the student must synthesize and summarize what they have read in their textbooks and heard in class
Week 4	Speaking (outside classroom) participate in casual conversations& express their opinions
Week 5	Listening understand the relationships between ideas presented (for example, compare/contrast, cause/effect, or steps in a process)
Week 6	Listening to various videos concerning the engineering fields as: (Mechanical engineering, electrical engineering in addition to renewable energies).
Week 7	**Mid-term Exam**
Week 8	Reading each word and each sentence, practice skimming a passage quickly to get a general impression of the main idea.
Week 9	Reading (Choose some unfamiliar words in the passage and guess the meanings from the context (surrounding sentences).
Week 10	Speaking (communicate with people in such places as the bookstore, the library, and the housing office)
Week 11	Speaking (increasing the student' ability to speak fluency and increasing its rate)
Week 12	Listening for pragmatic understanding (recognize a speaker's attitude and degree of certainty)
Week 13	Listening make connections among pieces of information in a conversation or lecture
Week 14	Writing (Often students need to write a paper or an essay response on an exam about what they are learning in their classes. This requires combining information they have heard in class lectures with what they have read in textbooks or other materials).
Week 15	Witting (take notes on what they hear and read, and use them to organize information before writing / summarize, paraphrase, and cite information from the source material accurately / write about the ways the information they heard relates to the information they read)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**

Required Texts	TOEFL Practice Online The official practice test that can help you go anywhere	No
Recommended Texts	The Cambridge Encyclopedia of the English Language by David Crystal	No
Websites	https://www.cambridge.org./	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Al-Ba'ath party Crimes**			**Module Delivery**	
Module Type	**A**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOBAB2301**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGII	**Semester of Delivery**		Three
Administering Department		Energy Engineering	**College**		College of Engineering\Al-Musayab
Module Leader	Abd Alkhaliq Mahdi		**e-mail**		E-mail
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Abd Alkhaliq Mahdi		**e-mail**		abdkhaliqmahdi@uobabylon.edu.iq
Peer Reviewer Name		Name	**e-mail**		E-mail
Scientific Committee Approval Date		01/09/2024	**Version Number**		2.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1- To familiarize students with the crimes committed by the Ba'ath regime against the Iraqi people. 2- To illustrate the psychological and moral consequences resulting from those crimes. 3- To raise students' awareness and provide them with a detailed understanding of the crimes committed by the Ba'ath regime against Iraqi society. 4- To enable students to understand the extent to which these crimes violated international laws, norms, and human rights conventions.
Module Learning Outcomes	1- Students will be introduced to the general concept of crimes, their legal classifications, and various categories. 2- Students will gain a deep understanding and recognition of the specific crimes committed by the Ba'ath regime in Iraq. 3- Students will examine the negative impacts and humanitarian tragedies resulting from these crimes, while analyzing their direct violation of international norms and global conventions.
Indicative Contents	The importance of studying the "Crimes of the Ba'ath Regime in Iraq" lies in its role as an educational and informative guide. It enables students to gain a comprehensive understanding and deep awareness of the various types of crimes committed against the Iraqi people by the oppressive Ba'athist clique. This is particularly crucial as current students did not witness these events firsthand and may lack a profound understanding of the gravity of these crimes and their stark violation of globally recognized international laws and norms. Ultimately, this course ensures that students grasp the magnitude of the tragedies and calamities endured by the Iraqi people under the Ba'athist era, acknowledging the sheer cruelty and brutality—including extrajudicial killings, mass detentions, torture, and systemic intimidation—that defined that period.

Learning and Teaching Strategies	
Strategies	1- Daily discussions to assess student comprehension and evaluating their active participation. 2- Implementing brief daily quizzes with diverse scientific questions to monitor students' understanding of the material. 3- Allocating a portion of the semester grade to homework assignments and independent tasks. 4- Evaluation based on regular quizzes, monthly exams throughout the curriculum, and a comprehensive final examination.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	31	**Structured SWL per Week (h/w)**	2
Unstructured SWL per Semester (h/sem)	19	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**50**		

Module Evaluation				
As	**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1-10
	Assignments	2	10% (10)	2, 12	LO # 3-10
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5-15
Summative assessment	**Midterm Exam**	2 hrs	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Definition of crime and its legal classifications
Week 2	Legal analysis under the Supreme Iraqi Criminal Tribunal (SICT) Law
Week 3	Types of International Crimes
Week 4	Decisions and sentences issued by the Supreme Iraqi Criminal Tribunal.
Week 5	Psychological Crimes
Week 6	Social Crimes
Week 7	The Ba'ath regime's stance and actions regarding religious institutions and beliefs
Week 8	Iraqi Law Violations
Week 9	Patterns of human rights abuses and crimes of state authority
Week 10	Political and Military Violations
Week 11	Environmental destruction caused by the regime in Iraq.
Week 12	Systematic destruction of cities and villages as a military strategy
Week 13	The draining of the Marshes (Ahwar) and the uprooting of date palm groves
Week 14	Documentation of genocide sites and mass graves committed by the Ba'ath regime
Week 15	A timeline-based study of mass graves and extermination sites in Iraq
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Dr. Hameed Hanoun Khalid, Human Rights.	Yes
Recommended Texts	Dr. Fakhri Rashid Al-Mihna and Dr. Salah Yassin Dawood, International Organizations, University of Mosul.	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**

Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Thermodynamics II**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2411**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	١٥٠			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	Four	
Administering Department	Energy Engineering		**College**	College of Engineering\Al-Musayab	
Module Leader	Ali Jaber Abdulhamed		**e-mail**	msb.ali.jaber@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To develop problem solving skills and understanding of Entropy. 2. To understand of 2nd law of thermodynamics. 3. To understand exergy. 4. To develop problem solving skills and understanding of Isentropic Efficiency of Turbine, nozzle, compressor & pump. 5. To develop problem solving skills and understanding of power plant cycles. 6. To develop problem solving skills and understanding of refrigerant cycles.
Module Learning Outcomes	1. Know what the entropy. 2. Recognize how the 1st law of thermodynamics works in open system SSSF. 3. Recognize between energy and exergy. 4. Know the Isentropic Efficiency of Turbine, nozzle, compressor & pump. 5. Know the principles of power plant cycles. 6. Know the principles of refrigerant cycles. 7. Recognize between engine and refrigerant cycles.
Indicative Contents	**Indicative content includes the following**. • Introduction, Definition, reversible processes, irreversible processes, irreversibility, entropy, general notices. Open System Unsteady State Steady Flow (U.S.S.S.F.) **[20 hrs]** • Second law of thermodynamics, close systems, open systems, exergy. **[15 hrs]** • Isentropic Efficiency of Turbine, nozzle, compressor & pump. **[20 hrs]** • Power plant cycles, refrigerant cycles. **[20 hrs]**

Learning and Teaching Strategies	
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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	79	**Structured SWL per Week (h/w)**	5
Unstructured SWL per Semester (h/sem)	71	**Unstructured SWL per Week (h/w)**	5
Total SWL per Semester (h/sem)	١٥٠		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (20)	5 and 10	LO #1 - #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	11	LO #3, #5 and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #4
	Final Exam	٣hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Some Concept and Definitions
Week 2	Open System Unsteady State Steady Flow (U.S.S.S.F.)

Week 3	Entropy
Week 4	Reversible Processes
Week 5	The 2nd law of thermodynamic in close system
Week 6	The 2nd law of thermodynamic in open system
Week 7	Exergy
Week 8	Mid-term Exam
Week 9	Isentropic Efficiency of Turbine
Week 10	Isentropic Efficiency of Compressors & Pump, and Nozzle
Week 11	The Ideal Cycle for Gas-Turbine Engines (Brayton Cycle)
Week 12	Rankin Cycle "Steam Power Plant"
Week 13	The Ideal Reheat Rankin Cycle
Week 14	The Ideal Regenerative RANKINE Cycle
Week 15	Refrigerant cycles
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Determining the volumetric expansion coefficient of liquids
Week 2	Lab 2: Converting electrical energy into heat energy– Measuring with a voltmeter and an ammeter (Joule equivalent)
Week 3	Lab 3: Heat engine (Carnot cycle).
Week 4	Lab 4: Refrigerant cycles
Week 5	Lab Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamental of Classical Thermodynamics / Van Wylen	Yes
Recommended Texts	Thermodynamics: an Engineering Approach / Yunus Cengel	Yes
Websites	https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Thermodynamics%3A+an+Engineering+Approach&btnG=	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Fluid Mechanics II**			**Module Delivery**	
Module Type	**S**			☒ **Theory**	
Module Code	**ERE2412**			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Four		
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab		
Module Leader	Sanaa Abdulrazaq Jassim	**e-mail**	met.sanaa.abd@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	PHD		
Module Tutor		**e-mail**			
Peer Reviewer Name	None	**e-mail**	E-mail		
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0		

Relation with other Modules			
Prerequisite module	Fluid Mechanics I	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) To study the fluid mechanics in dynamic science, and why study fluid mechanics, and to understand principal equations for motion. 2) To learn energy equation of fluids in dynamic. 3) Study the applications of continuity and energy equations of fluid, the use of different devices to measure flow rate in closed and open systems. 4) study the Resistance to flow in open and closed conduits, 5) To define Flow in pipes (laminar and turbulent flow). Classify types of losses through pipes flow and calculating them. 6) To learn momentum equations of fluids in dynamic, and their applications. 7) to study Introduction to pumps and Turbines, Application, - Types of pumps and Turbines and types of joining systems. 8) Understand Dimensional analysis - Dimensional analysis (the π-theorem). Dimensionless parameters (Reynolds no., Froude no…. etc.) 9) to carry testing of fluids, measuring fluid flow by venture, measuring major and minor losses in pipe flow, test parallel and series systems of pumps, measuring impact of water jet.

Module Learning Outcomes	1- To understand Steady-state energy equation, draw its energy line and hydraulic line. 2- Applications of continuity and energy equations, flow measurements through closed and open systems. 3- Study Resistance to flow in open and closed conduits. 4- Define Flow in pipes (laminar and turbulent flow) 5- Calculate Losses in pipes (major and minor losses). 6- Define pumps and Turbines, Types of pumps and Turbines and application. Systems of joining. 7- Understand momentum equations of fluids in dynamic. Calculate momentum force at open and closed systems and their applications 8- Define Dimensional analysis - Dimensional analysis by (the π-theorem). Dimensionless parameters (Reynolds no., Froude no…. etc.) 9- With regard to the practical side, the program aims to familiarize students with experiments related to flow measurement by venture, measurement of major losses of energy of pipe flow, measuring pressure and flow rate through pipe for pumps at series and parallel, measuring impact of water jet.
Indicative Contents	**Indicative content includes the following**. • Steady state energy equation and application of it with continuity equation through open and closed systems (flow measurements). [20 hr]. • Study the study Resistance to flow in open and closed conduits. Define Flow in pipes (laminar and turbulent flow) and Calculate Losses in pipes (major and minor losses). [20 hr] • Define pumps and Turbines, Types of pumps and Turbines and applications, systems of joining. [10 hr]. • Understand momentum equations of fluids in dynamic. Calculate momentum force at open and closed systems and their applications. [15 hr] • Define Dimensional analysis - Dimensional analysis by (the π-theorem). Dimensionless parameters (Reynolds no., Froude no…. etc.) [10 hr].

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	79	**Structured SWL per Week (h/w)**	5
Unstructured SWL per Semester (h/sem)	71	**Unstructured SWL per Week (h/w)**	4
Total SWL per Semester (h/sem)	**150**		

Module Evaluation					
		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
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

Summative assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Steady-state energy equation
Week 2	Flow Measurement in closed conduits by (Pitot tube), (Venturi meter)
Week 3	Flow Measurement in closed conduits by (orifice meter), (nozzle)
Week 4	Flow Measurement in open conduits by weirs different types of weirs, with applications.
Week 5	Resistance to flow in closed conduits
Week 6	Resistance to flow in open conduits,
Week 7	Flow in pipes (laminar and turbulent flow) (Mid-term Exam)
Week 8	Losses in pipes (major and minor losses) (Moody chart)
Week 9	Liner momentum equation and its application.
Week 10	Momentum in Open system (fixed and moving blades).
Week 11	Momentum in Closed system (bend pipes)
Week 12	Introduction to pumps and Turbines. Application, - Types of pumps and Turbines and application
Week 13	Connection between pumps, series and parallel.
Week 14	Dimensional analysis. Dimensional analysis (the π-theorem)
Week 15	Dimensionless fluid parameters (Reynolds no., Froude no…etc.)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Experiment 1: Bernoulli′s theorem demonstration
Week 2	None
Weeks 3-	Experiment 2: Flow through venture meter.
Week 4-7	None
Week 8	Experiment 3: major losses in pipes.
Week 9	Experiment 4: minor losses in pipes
Week 10	Experiment 5: Impact of jet water
Week 11	Experiment 6: The difference between series and parallel connection of pumps.
Week 12-15	None

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Frank M. White, Fluid Mechanic, fifth ed.,	Yes
Recommended Texts	1- A Textbook of Fluid Mechanics and Hydraulic Machines. 2010 2- FLUID MECHANICS FOR ENGINEERS, 2011	No
Websites	https://www.infobooks.org/free-pdf-books/engineering/fluid-mechanics/ https://www.academia.edu/20207960/Fluid_Mechanics_Textbook	

Grading Scheme

Group	Grade	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information

Module Title	**Electronic Circuits**		**Module Delivery**	
Module Type	**S**		☒ **Theory**	
Module Code	**ERE2403**		☐ **Lecture**	
ECTS Credits	**4**		☐ **Lab**	
SWL (hr/sem)	**100**		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**	Three	
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	
Module Leader	Ahmed Mohammed Merza	**e-mail**	ahmed.hatrush@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Lec	**Module Leader's Qualification**	M.Sc.	
Module Tutor		**e-mail**		
Peer Reviewer Name	None	**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0	

Relation with other Modules

Prerequisite module	Electrical Circuits	**Semester**	One
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Understand conduction using electron and hole theory. 2. Develop a clear understanding of the basic operation and characteristics of a diode in the no-bias, forward-bias, and reverse-bias regions. 3. Be able to describe the difference between *n* - and *p* -type materials. 4. Understand the concept of load-line analysis and how it is applied to diode networks. 5. Become familiar with the use of equivalent circuits to analyze series, parallel, and series-parallel diode networks. 6. Understand the process of rectification to establish a dc level from a sinusoidal ac input. 7. Become familiar with the basic construction and operation of the Bipolar Junction Transistor. 8. Be able to determine the dc levels for the variety of important BJT configurations. 9. Become familiar with the construction and operating characteristics of Junction Field Effect (JFET), Metal-Oxide Semiconductor FET (MOSFET), and Metal-Semiconductor FET (MESFET) transistors. 10. Be able to perform a dc analysis of JFET, MOSFET, and MESFET networks. 11. Become acquainted with the small-signal ac model for a JFET and MOSFET.

Module Learning Outcomes	1. Understanding of the basic principles and concepts of electronic circuits. 2. Ability to design and analyze electronic circuits using various electronic components. 3. Ability to troubleshoot electronic circuits and identify faults. 4. Knowledge of different types of electronic circuits, such as analog and digital circuits, and their applications. 5. Knowledge of different types of electronic devices, such as transistors, diodes, and operational amplifiers, and their applications in electronic circuits. 6. Understanding of safety measures while working with electronic circuits. 7. Ability to apply the knowledge and skills learned in electronic circuits to create various electronic systems. 8. Development of critical thinking and problem-solving skills. 9. Preparation for pursuing a career in electronics engineering or related fields.
Indicative Contents	**Indicative content includes the following**. **Semiconductor diode:** Introduction, semiconductor materials: Ge, Si, AND GaAs, covalent bonding and intrinsic materials, energy levels, n -type and p -type materials, semiconductor diode, diode equivalent circuits, reverse recovery time, diode testing, Zener diodes, light-emitting diodes, **Diode Applications:** introduction, load-line analysis, series diode configurations, parallel and series–parallel configurations, and/or gates, sinusoidal inputs; half-wave rectification, full-wave rectification, clippers, clampers, Zener diodes, voltage-multiplier circuits. [8 hrs] **Bipolar Junction Transistors:** introduction**,** transistor construction, transistor operation, Common-Base Configuration, Common-Emitter Configuration, Common-Collector Configuration, Limits of Operation, Transistor Specification Sheet, Transistor Testing, **DC Biasing—BJTs**: Fixed-Bias Configuration, Emitter-Bias Configuration, Voltage-Divider Bias Configuration, Collector Feedback Configuration, Emitter-Follower Configuration, Common-Base Configuration. [8 hrs] **Field-Effect Transistors**: Construction and Characteristics of JFETs, Transfer Characteristics, Important Relationships, Depletion-Type MOSFET, Enhancement-Type MOSFET, **FET Biasing:** Introduction, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, Common-Gate Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs. [6 hrs] **FET Amplifiers:** FET Amplifiers, Introduction, JFET Small-Signal Model, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Configuration, Common-Gate Configuration, Source-Follower (Common-Drain) Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs, MOSFET Drain-Feedback Configuration, E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks, Operational Amplifier: Introduction, Differential Amplifier Circuit, Op-Amp Basics, Practical Op-Amp Circuits. [8 hrs]

Learning and Teaching Strategies

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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	36	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**100**		

Module Evaluation					
		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)	3 and 12	LO #3, #4 and #6, #7
	Projects	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%		

Delivery Plan (Theoretical Weekly Syllabus)	
Week	**Material Covered**
Week 1&2	**Semiconductor diode:** Introduction, semiconductor materials: Ge, Si, AND GaAs, covalent bonding and intrinsic materials, energy levels, n -type and p -type materials, semiconductor diode, diode equivalent circuits, reverse recovery time, diode testing, Zener diodes, light-emitting diodes
Week 3&4	**Diode Applications:** introduction, load-line analysis, series diode configurations, parallel and series–parallel configurations, and/or gates, sinusoidal inputs; half-wave rectification, full-wave rectification, clippers, clampers, Zener diodes, voltage-multiplier circuits.
Week5& 6	**Bipolar Junction Transistors:** introduction**,** transistor construction, transistor operation, Common-Base Configuration, Common-Emitter Configuration, Common-Collector Configuration, Limits of Operation, Transistor Specification Sheet, Transistor Testing.
Week 7&8	**DC Biasing—BJTs**: Fixed-Bias Configuration, Emitter-Bias Configuration, Voltage-Divider Bias Configuration, Collector Feedback Configuration, Emitter-Follower Configuration, Common-Base Configuration.
Week 9	**Field-Effect Transistors**: Construction and Characteristics of JFETs, Transfer Characteristics, Important Relationships, Depletion-Type MOSFET, Enhancement-Type MOSFET.
Week 10& 11	**FET Biasing:** Introduction, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, Common-Gate Configuration, Depletion-Type MOSFETs, Enhancement-Type MOSFETs.
Week 12&13	**FET Amplifiers:** FET Amplifiers, Introduction, JFET Small-Signal Model, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Configuration, Common-Gate Configuration, Source-Follower (Common-Drain) Configuration.
Week 14	Depletion-Type MOSFETs, Enhancement-Type MOSFETs, MOSFET Drain-Feedback Configuration, E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks.
Week 15	Operational Amplifier: Introduction, Differential Amplifier Circuit, Op-Amp Basics, Practical Op-Amp Circuits.
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Diode characteristics
Week 2	half-wave rectification, full-wave rectification
Week 3&4	clippers, clampers, Zener diodes, voltage-multiplier circuits
Week 5	Bipolar Junction Transistors, Common-Base Configuration, Common-Collector Configuration.
Week 6	Common-Emitter Configuration, Transistor Testing.
Week 7	FET Biasing: Fixed-Bias Configuration, Self-Bias Configuration.
Week 8	FET Biasing: Voltage-Divider Biasing, Common-Gate Configuration
Week 9	Depletion-Type MOSFETs, Enhancement-Type MOSFETs.
Week 10&11	Operational Amplifier: Differential Amplifier Circuit, Op-Amp Basics,
Week 12 - 14	Practical Op-Amp Circuits.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	***Electronic Devices and Circuit Theory, Eleventh Edition Robert L. Boylestad and Louis Nashelsky***	No
Recommended Texts		
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information		
Module Title	**Principles of Energy Engineering**	**Module Delivery**
Module Type	**C**	**☒ Theory**
Module Code	**ERE2404**	**☐ Lecture**
ECTS Credits	**6**	

SWL (hr/sem)	**150**	☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Wisam J. Khudayer	**e-mail**	Met.wisam.j@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1) Develop an understanding of the concepts of energy, power and work 2) Understand the conservation law of material / energy and perform material / energy balance in energy systems. 3) Enable students to identify and apply fundamental principles of chemistry and physics, as they pertain to energy and fuels, and mathematics to describe materials and energy flow through a process. 4) Enable students to describe the energy transformations in energy systems. 5) In addition, the course will present an introduction to chemical kinetics with an overview of solid, liquid and gaseous fuel transformations.
Module Learning Outcomes	1- Understand the concepts of energy, power, and work 2- Identify the main energy forms 3- Recognize the differences between renewable and non-renewable resources 4- An ability to apply knowledge of mathematics, science, and engineering in Energy-related disciplines 5- An ability to apply material balance on energy-related systems 6- An ability to apply energy balance on energy-related systems 7- Understanding the fundamentals of electrochemical energy conversion
Indicative Contents	**Indicative content includes the following**. Principles of energy engineering course will cover the basic engineering calculation and mathematical methodologies on material and energy balances and reaction rates during chemical transformations in energy systems. This is a required introductory course to the BS in energy engineering degree program. Students will be evaluated based on quizzes, homework, class participation, writing report, interactive tutorial and Mid-term and final exams.

Learning and Teaching Strategies

Strategies	The main strategy that will be adopted in delivering this module is to encourage student's participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through lectures, interactive tutorials, assignments, quizzes, and by considering various activities that are interesting to the students such as case-study, seminars, take-home exam, and industrial visits.

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	64	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	86	**Unstructured SWL per Week (h/w)**	6
Total SWL per Semester (h/sem)	**150**		

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

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Introduction to Energy Engineering, Energy, Power, and work Definitions
Week 2	The Law of mass/energy Conservation, Energy Forms, Renewable and non-Renewable Resources.
Week 3	Introduction to Engineering Calculations: Units and Dimensions, The Mole Unit
Week 4	Conventions in Methods of Analysis and Measurements, and Basis.
Week 5	The Chemical Equation and stoichiometry,
Week 6	The Material Balance with/without Chemical Reactions
Week 7	Solving Material Balance Problems Involving Multiple Subsystems,
Week 8	Recycle, By pass, and Purge Calculations
Week 9	Energy Balances, Concepts and Units,
Week 10	Heat Capacity, calculation of enthalpy Changes (without change of phase), and Enthalpy Changes for Phase Transitions
Week 11	The General Energy Balance
Week 12	Reversible Processes and the Mechanical Energy Balance
Week 13	Energy Balance with Chemical Reactions
Week 14	Electrochemical Energy Conversion I
Week 15	Electrochemical Energy Conversion II
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**

Required Texts	1. David M. Himmel Blau, "Basic Principles and Calculations in Chemical Engineering", Fifth Edition, Prentice-Hall International Editions, 1989. 2. Albert P.E. Thumann, "Fundamentals of Energy Engineering" Prentice-Hall 1984 3. Introduction to Energy Engineering, Mihir Sen, Department of Aerospace and Mechanical Engineering, University of Notre Dame Notre Dame, IN 46556 December 2, 2015	YES
Recommended Texts	Colorado Energy Management Handbook, Sixth Edition, 2007, by The Fairmont Press, Colorado, USA.	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A** – Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information				
Module Title	**Engineering Mathematics II**		**Module Delivery**	
Module Type	**S**		☒ **Theory**	
Module Code	**ERE2416**		☐ **Lecture**	
ECTS Credits	**4**		☐ **Lab**	
SWL (hr/sem)	**100**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII	**Semester of Delivery**		Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab	

Module Leader	Mohammed Ali Al-Shuraifi	**e-mail**	Msb.Mohammed.Ali@uobabylon.edu.iq
Module Leader's Acad. Title	Lecture	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	2.0

Relation with other Modules			
Prerequisite module	Mathematics	**Semester**	1
Co-requisites module	Applied Mathematics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	8. Understanding the basic concepts of calculus, differential equations, and linear algebra. 9. Applying mathematical principles to solve engineering problems. 10. Developing skills in mathematical modeling and simulation. 11. Understanding the role of mathematics in engineering design and analysis. 12. Developing critical thinking and problem-solving skills. 13. Developing effective communication skills in mathematics. 14. Understanding the importance of mathematical accuracy and precision in engineering.
Module Learning Outcomes	1. Understanding the concept of vectors and their representation in two and three dimensions. 2. Being able to perform vector operations such as addition, subtraction, scalar multiplication, dot product, and cross product. 3. Understanding the concept of periodic functions and their representation using Fourier series. 4. Learning the techniques to calculate Fourier coefficients and Fourier series. 5. Applying Fourier series to solve problems in signal processing, heat transfer, and wave propagation. 6. Understanding the concept of Fourier transform and its applications. 7. Understanding the properties of Fourier transform, such as linearity, time shifting, and frequency shifting 8. Understand the basic concepts and terminology of differential equations. 9. Solve first-order differential equations using various techniques such as separation of variables, integrating factors, and exact equations. 10. Solve second-order differential equations with constant coefficients using various techniques such as characteristic equations and undetermined coefficients. 11. Solve higher-order differential equations and systems of differential equations. 12. Understanding the concept of Laplace transform and its application in solving differential equations. 13. Ability to transform time-domain signals into frequency-domain signals using Laplace transform. 14. Understanding the properties of Laplace transform, such as linearity, time shifting, differentiation, integration, convolution, and initial and final value theorems. 15. Understanding the concepts of sequences and series, including arithmetic and geometric sequences, and the sum of a finite and infinite series. 16. Solving problems involving sequences and series, such as finding the nth term, the sum of the first n terms, and the limit of a sequence.
Indicative Contents	**Indicative content includes the following**. • Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations. Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector. [8 hrs]

	• **Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering. **Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications. [16 hrs] • **Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point. **Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations. [20 hrs] • **Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications. [12 hrs] • **Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series. [4 hrs]

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	59	**Structured SWL per Week (h/w)**	4
Unstructured SWL per Semester (h/sem)	41	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**100**		

Module Evaluation					
		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)	3 and 12	LO #3, #4 and #6, #7
	Projects	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%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Circles, parabola, ellipse, hyperbola, rotation, hyperbolic functions, inverse hyperbolic functions. Polar coordinate and parametric equations.
Week 2	**Vector Analysis**: Equations of lines and planes, product of three or more vectors, vector function and motion: velocity and acceleration, tangential vectors, curvature and normal vector**.**
Week3& 4	**Fourier series:** Periodic functions, Fourier series, Euler formulas, even and odd functions (Half–Range expansions), applications in electrical engineering.

Week 5&6	**Fourier Transform:** Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem, power spectral density and convolution signals and linear system applications.
Week 7&8	**Partial Differentiation:** Function of two or more variables, partial derivatives, directional derivative, gradient, divergence, curl, tangent plane and normal line, maxima, minima, saddle point.
Week 9 & 10& 11	**Ordinary Differential Equations:** First order (variables separable, homogeneous, linear – Bernoulli and exact, second order (homogeneous and non-homogeneous), higher order differential equations
Week 12 &13&14	**Laplace Transform:** Unit step function, Gamma function, definition of Laplace transform, properties, inverse of Laplace transform, properties, partial fractions, convolution theorem, integral equation, solution of differential equations using Laplace transform, applications.
Week 15	**Sequences and Series:** Sequences (convergence, test of monotone), series (geometric series, nth partial sum, test of convergence, alternating series), power and Taylor's series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	***Advanced Engineering Mathematics (Muhadharaty)***	No
Recommended Texts	Engineering-mathematics-ii-2009-cuppy	No
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information		
Module Title	**Computer Programming (MATLAB)**	**Module Delivery**
Module Type	**E**	**☒ Theory**
Module Code	**ERE2405**	

ECTS Credits	**4**	☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
SWL (hr/sem)	**100**	

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Ahmed Hadi Hussain	**e-mail**	Met.ahmed.hadi@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To develop problem solving skills and understanding of differential equations and their solving in practical problems. 2. To understand plotting of functions from a given data. 3. This course deals with the basic concept of Graphic 2D and 3D. 4. This is the basic subject for all methods of differential forms. 5. To understand matrixes and limits Laws problems. 6. To perform mesh and fundamentals of 3D graphs.
Module Learning Outcomes	1. Recognize the classification of functions with their solving. 2. List the various terms associated with the plotting of functions. 3. Summarize what is meant by differential and integration forms in different applications. 4. Define differential and integral forms in MATLAB. 5. Identify the basic Looping with for and while, controlling loops with break and continue, terminating execution with return. 6. Discuss the operations of matrices.
Indicative Contents	Indicative content includes the following. 1- Getting Started to MATLAB 2- Structured Programming 3- MATLAB Basic Program Components 4- Derivatives & integration and Applications of them 5- Program Control Units 6- Matrices and their types 7- System of linear equation 8- MATLAB Graphics 2D 9- Solving systems of linear equations 10- MATLAB Graphics 3D

Learning and Teaching Strategies	
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) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	49	**Structured SWL per Week (h/w)**	3
Unstructured SWL per Semester (h/sem)	51	**Unstructured SWL per Week (h/w)**	3
Total SWL per Semester (h/sem)	**100**		

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

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Getting Started to MATLAB
Week 2	Structured Programming
Week 3	Interviewing the basic classes in MATLAB, how MATLAB handles matrices as the major variables in the program, basic operations
Week 4	MATLAB Basic Program Components
Week 5	The student should get reasonable information of how to use MATLAB for structured programming; therefore, structured programming fundamentals are defined before going forward with MATLAB
Week 6	Defining Recursive Functions in MATLAB
Week 7	Matrices, Matrix and Operations on them (Mid-term Exam)
Week 8	System of linear equation
Week 9	Linear Algebra: First Order Systems
Week 10	MATLAB Graphics 2D
Week 11	MATLAB Graphics 3D
Week 12	Solve of system linear equations, gauss-eliminations, gauss-Jordan eliminations, grammar Rull
Week 13	Functions of a single or more than single variable, Plot one dimensions and two dimensions
Week 14	Program Control Units
Week 15	Looping with for and while, controlling loops with break and continue, terminating execution with return
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Lab 1: Introduction to Write function: Introducing how to define a function in MATLAB. Building and calling a function with different headers through variable arguments
Week 2	Lab 2: types of matrices and solve of system linear equations by using gauss-eliminations, gauss-Jordan eliminations, grammar Rull
Week 3	Lab 3: Application of recursion with mathematics, using functions to solve serial equations.
Week 4	Lab 4: Looping with for and while, controlling loops with break and continue, terminating execution with return
Week 5	Lab 5: Handling the first order equations and some examples to solve mathematical methods. Differential equations and how MATLAB manipulates them are the discussed, in addition to using more properties of the plotting function
Week 6	Lab 6: Basic 2D graphics, various approaches to generate two dimensions graphics.
Week 7	Lab 7: Basic 3D graphics, fundamentals of 3D graphs.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Essential MATLAB for engineers and scientist (fifth edition) by Brian H. Hahn and Daniel T. Valentine.	Yes
Recommended Texts	Basic of MATLAB and beyond by Andrew Knight	No
Websites	https://www.mathworks.com/academia/courseware/teaching-first-year-engineering-with-matlab-and-simulink.html	

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information		
Module Title	**Computer Science II**	**Module Delivery**
Module Type	**B**	☐ **Theory**
Module Code	**UOBAB2004**	

ECTS Credits	**3**	☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**
SWL (hr/sem)	**75**	

Module Level	UGII	**Semester of Delivery**	Four
Administering Department	Energy Engineering	**College**	College of Engineering\Al-Musayab
Module Leader	Omar Ahmed Naeem	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Omar Ahmed Naeem	**e-mail**	Msb.omar.alkawak@uobabylon.edu.iq
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	2.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The computer science curriculum aims to introduce the student to computer science and the skills related to this subject. The main purpose of the course is to introduce the student to an idea about the computer Networking and its Security and Networking components and how each of its parts works through an explanation of the Security and Networking, E-Commerce, Computer Troubleshooting, Introduction to Al, The Role of Al in Modern Smartphones, Applications and Tools of Al, Al and Society, Ethical Challenges in Al, The Future of Al and protect against virus risks.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. A- Cognitive objectives A1- During the year, the student learns an idea about the computer Networking and its Security. A2- Enabling the student to know the main principles of the computer Networking and its Security. and the mechanisms used for their purpose. A 3- Enabling the student to know all the basics that he uses in the scientific subject A 4- Definition of computer, its development history and generations A 5- An explanation of the computer system with all its elements and systems A 6- Introducing the student to the input unit, its principles of work, its types, and the work of the programs A 7- Applications and Tools of Al b- The skill objectives of the subject B1 - Familiarity with developments in the field of AI B2 - Familiarity with Future of Al and protect against virus risks

	B3 - Enabling the student to understand every part of the computer, how it works, and the work of the basic office programs B4- Giving the student an opportunity to explain a small part of the class to his classmates to enhance his self-confidence. B5- Solve a small part of the homework to urge the students to complete the solution, give class assignments, and make groups to solve these assignments.
Indicative Contents	The students will be able to identify the values, trends and patterns of behavior that uphold the ethics of the profession and work to adhere to them after graduation. 1-Urging the student to understand the objective of studying the subject in general. 2-Urging the student to think about how to develop oneself in the field of computers. 3 -Making the student able to deal with the AI tools and how to use the AI applications in accordance with the rules and regulations of engineering.

Learning and Teaching Strategies	
Strategies	1. The teacher prepares lectures on the subject in soft electronic form and presents them to the students. 2. The teacher gives lectures in detail. 3. the teacher requests periodic reports and homework on the basic subjects of the subject. 4. Academic methods and lectures 5. Dialogue modalities 6. Use projectors 7. Providing the student with basic and secondary topics related to computer work 8. Translating theoretical topics and vocabulary related to computer technologies 9. Requiring the student to follow developments in computer science

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	44	**Structured SWL per Week (h/w)**	3
Unstructured SWL per Semester (h/sem)	31	**Unstructured SWL per Week (h/w)**	2
Total SWL per Semester (h/sem)	**75**		

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

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Security and Networking
Week 2	Security and Networking (Cont.)

Week 3	E-Commerce
Week 4	Computer Troubleshooting
Week 5	Computer Troubleshooting (Cont.)
Week 6	Introduction to Al
Week 7	Introduction to Al (Cont.)
Week 8	The Role of Al in Modern Smartphones
Week 9	**Midterm Exam**
Week 10	Applications and Tools of Al
Week 11	Applications and Tools of Al (Cont.)
Week 12	Applications and Tools of Al (Cont.)
Week 13	Al and Society
Week 14	Ethical Challenges in Al
Week 15	The Future of Al
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	What is a network? Types of networks. Basic network components
Week 2	Network Security Basics. Understanding network threats. Network Troubleshooting
Week 3	Concepts of Electronic banking services this include online banking: ATM and debit card services.
Week 4	Introduction to Computer Troubleshooting, Common Hardware Issues and Solutions, Diagnosing Software Problems
Week 5	Troubleshooting Operating System Issues, Identifying and Resolving Blue Screen Errors, Dealing with Slow Computer Performance. Virus and Malware Removal Techniques, Updating Drivers and Software.
Week 6	Definition of Al, History of Al, Al Techniques and Approaches.
Week 7	Al Tools and Frameworks.
Week 8	Al-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa)
Week 9	**Midterm Exam**
Week 10	Overview of Al Applications in Various Industries, Education and Healthcare.
Week 11	Al in Image and Video Analysis, Smart Cities
Week 12	Future Trends in Al Applications and Tools.
Week 13	Introduction to Al and Its Societal Impact, The Role of Al in Enhancing Public Safety.
Week 14	Introduction to Ethics in Al, Transparency and Explainability of Al Systems, Privacy Concerns in Al Data Usage
Week 15	Future trends in Al, recent research and emerging technologies.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1.Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology™, 3rd Edition (2020) 2.Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action Complete",16th Edition (2020). 3.Lectures provided by the subject teacher	No
Recommended Texts	1. William Stallings, Computer Organization & Architecture, Sixth edition, Person Education 2. Donald H. Sanders, Computer today, Second edition, McGraw –hill	No

	3. Lectures provided by the subject teacher 4. Books available in the college library	
Websites		

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
	D – Satisfactory	60 – 69	Fair but with major shortcomings
	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
	F – Fail	(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 Information					
Module Title	**Arabic Language II**			**Module Delivery**	
Module Type	**B**			☒ **Theory**	
Module Code	**UOBAB2001**			☐ **Lecture**	
ECTS Credits	**2**			☐ **Tutorial**	
SWL (hr/sem)	**50**			☐ **Practical**	
				☐ **Seminar**	
Module Level		UGII	**Semester of Delivery**		Four
Administering Department		Energy Engineering	**College**		College of Engineering\Al-Musayab
Module Leader	Noor Mohammed Jasim		**e-mail**		msb.noor.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name	None		**e-mail**		E-mail
Scientific Committee Approval Date		01/09/2024	**Version Number**		2.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. **Language Proficiency:** To develop learners' competency in reading, writing, speaking, and listening. This includes enhancing vocabulary, mastering grammar, and improving pronunciation and comprehension skills. 2. **Communication Skills:** To enhance learners' ability to communicate effectively in Arabic by focusing on practical usage, such as engaging in conversations, expressing opinions, and participating in diverse communicative activities. 3. **Cultural Understanding:** To promote cultural awareness of the Arab world by introducing learners to the customs, traditions, literature, history, and social aspects of Arabic-speaking countries. 4. **Functional Language Use:** To equip learners with the necessary linguistic skills for specific functional tasks, such as travel, shopping, dining, healthcare, and professional business interactions. 5. **Linguistic Accuracy:** To emphasize grammatical precision and proper language structure, including the study of syntax and morphology to produce coherent and error-free discourse. 6. **Independent Learning:** To foster the learners' ability to explore the Arabic language independently by encouraging self-study, providing resources for further practice, and developing effective language acquisition strategies. 7. **Assessment and Progress:** To evaluate learners' progress and provide constructive feedback, allowing both students and instructors to assess achievements and identify areas for improvement.
Module Learning Outcomes	1. **Listening Comprehension:** Demonstrate the ability to understand and comprehend spoken Arabic across a range of topics and contexts, including conversations, presentations, and audio recordings. 2. **Reading Comprehension:** Demonstrate the ability to read and understand written Arabic texts of varying difficulty levels, such as articles, stories, and authentic materials, while extracting relevant information. 3. **Speaking Proficiency:** Communicate effectively in Arabic by expressing ideas, opinions, and information in spoken form. Engage in conversations, participate in discussions, and deliver presentations using appropriate vocabulary, grammar, and pronunciation. 4. **Writing Proficiency:** Produce written texts in Arabic, such as essays, reports, emails, and letters, with clarity, coherence, and grammatical accuracy. Apply appropriate language conventions, including spelling, punctuation, and paragraph structure. 5. **Vocabulary and Grammar:** Demonstrate a wide range of vocabulary and an understanding of Arabic grammar rules and structures. Use appropriate vocabulary to express thoughts and ideas accurately, applying grammatical rules effectively in both written and spoken communication. 6. **Cultural Awareness:** Demonstrate an understanding of the cultural aspects of Arabic-speaking countries, including customs, traditions, and social norms. Recognize and respect cultural differences and apply cultural knowledge appropriately in language use. 7. **Linguistic Fluency:** Develop fluency in Arabic by speaking and responding spontaneously without excessive hesitation. Demonstrate the ability to maintain a conversation, negotiate meaning, and handle various communication situations with confidence. 8. **Critical Thinking:** Apply critical thinking skills to analyze and evaluate Arabic texts, including news articles, literary works, and cultural materials. Formulate and support opinions, make connections, and demonstrate understanding beyond a superficial level. 9. **Independent Learning:** Take responsibility for self-directed learning by utilizing resources and strategies to develop Arabic language proficiency. Demonstrate the ability to engage in self-study and seek opportunities for continuous improvement.

	10. **Intercultural Communication**: Engage in effective intercultural communication by demonstrating an understanding of cultural differences, adapting language use accordingly, and showing respect for diverse perspectives.
Indicative Contents	• **Subject and Predicate (Al-Mubtada' wa Al-Khabar):** Constructing sentences using the subject (Mubtada') and predicate (Khabar). • **Linguistic Corrections:** Identify and apply essential linguistic corrections. • **Punctuation Marks:** Utilize appropriate punctuation marks correctly to enhance the clarity and structure of written Arabic. • **Hamza of 'Inna' (Fat-ha and Kasra):** Rules for the mandatory opening (Fat-ha) and breaking (Kasra) of the Hamza in "Inna." • **Narrative Literature:** Demonstrate a comprehensive understanding of the characteristics and development of Arabic narrative literature. • **Arabic Literature:** Enhance the student's linguistic wealth and vocabulary through the study of diverse Arabic literary texts. • **Free Verse vs. Classical Poetry**: Differentiate between the structural and rhythmic characteristics of Classical (Columnar) poetry and Free Verse poetry. • **The Rules of Numbers:** Apply the correct grammatical rules for writing and using numbers in Arabic sentences. • **Hafez Ibrahim:** Provide a scholarly biography and literary analysis of the life and works of the poet Hafez Ibrahim. • **Badr Shakir al-Sayyab**: Provide a scholarly biography and literary analysis of the life and works of the poet Badr Shakir al-Sayyab. • **Al-Jawahiri:** Provide a scholarly biography and literary analysis of the life and works of the poet Muhammad Mahdi Al-Jawahiri. • **Hamzat al-Qat'**: Identify and extract the "Hamzat al-Qat'" correctly within various Arabic texts.

Learning and Teaching Strategies	
Strategies	• **Communicative Approach:** Emphasizing meaningful Arabic communication through authentic conversations, role-plays, and real-life scenarios to develop speaking and listening skills. • **Integrated Skills:** Integrating listening, speaking, reading, and writing through activities that reinforce these skills simultaneously, such as reading then discussing and responding and writing a reflective response. • **Authentic Materials:** Incorporating real-world Arabic content, including news articles, literature, and multimedia, to enhance linguistic proficiency and cultural understanding. • **Contextual Learning:** Teaching Arabic within meaningful contexts related to learners' interests and relevant life situations to ensure an engaging learning experience. • **Multimedia Approaches:** Utilizing diverse visual, auditory, and interactive resources, including online tools and language apps, to cater to various learning styles. • **Task-Based Learning:** Organizing language learning around specific tasks, such as planning trips or engaging in debates, to promote functional language use and problem-solving

Student Workload (SWL) Calculated over 15 weeks			
Structured SWL per Semester (h/sem)	30	**Structured SWL per Week (h/w)**	2

Unstructured SWL per Semester (h/sem)	20	Unstructured SWL per Week (h/w)	2
Total SWL per Semester (h/sem)	50		

Module Evaluation					
		Time/Numbr	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects				
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	2hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Theoretical Weekly Syllabus)	
	Material Covered
Week 1	Constructing sentences using the subject and predicate
Week 2	Identifying and applying essential linguistic correction
Week 3	Usage of Arabic punctuation marks
Week 4	Rules for (Fat-ha and Kasra) of Hamza of 'Inna'
Week 5	Introduction to the characteristics of Arabic narrative literature
Week 6	**Midterm Exam**
Week 7	Enhancing linguistic wealth through literary texts
Week 8	Differentiating between Classical (Columnar) and Free Verse poetry
Week 9	Grammatically correct usage and writing of numbers
Week 10	Biography and literary contribution of the poet Hafez Ibrahim
Week 11	Biography and literary contribution of the poet Badr Shakir al-Sayyab
Week 12	Biography and literary contribution of the poet Al-Jawahiri
Week 13	Identifying and extracting Hamzat al-Qat' from texts
Week 14	Correct usage of Hamzat al-Wasl in writing
Week 15	Constructing sentences from (Al-Mubtada' wa Al-Khabar)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	4- **Aliwi, S. H.** (2015). Al-Nahw al-Wasit (Intermediate Grammar). 1st ed. Amman, Jordan: Dar Safaa for Publishing and Distribution. 5- **Ibn Aqil.** (2006). Sharh Ibn 'Aqil on Alfiyyat Ibn Malik. 1st ed. Beirut, Lebanon: Dar Al-Kotob Al-Ilmiyah. **Dayf, S.** (2006). History of Arabic Literature. 2nd ed. Cairo, Egypt: Dar Al-Ma'aref.	Yes
Recommended Texts	3. **Al-Ansari, I. H.** (2009). Sharh Qatr al-Nada wa Ball al-Sada. 1st ed. Beirut, Lebanon: Dar Al-Hilal for Publishing and Distribution. **Al-Samarrai, F. S.** (2017). Meanings of Grammar (Ma'ani al-Nahw). Beirut, Lebanon: Dar Ibn Kathir for Publishing and Distribution.	No

Websites	Wikipedia, Arabic Language Forums

Grading Scheme			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	90 – 100	Outstanding Performance
	B - Very Good	80 – 89	Above average with some errors
	C – Good	70 – 79	Sound work with notable errors
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	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail **(Under Review)**	(45-49)	More work required but credit awarded
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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.			

The third stage/2025

Fuel and combustion

Course description form

1. Course Name
Fuel and combustion
2. Course Code
Em En Fci 303705 (2+0)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared
1-6-2023
5. Available attendance forms
Weekly

6. Number of study hours (total)/number of units (total)	
30 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Fouad Abdel Amir Khalaf - Ph.D Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001).	Objectives of the study subject

• Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies	
1. Interactive lectures: The professor can present the materials directly through lecture sessions. This method can be improved by mixing explanation with applied examples and opening the way for questions and discussions with students. 2. Projects and Research: You can direct students to conduct projects or research on specific topics in the Fuel and Combustion curriculum. This method encourages active and research learning and practical application of concepts. 3. Group discussions: Discussion sessions can be organized on specific topics in the curriculum. Students can share their views and engage in brainstorming and analysis.	**The strategy**

4. Problem-based learning: Set complex challenges and problems related to curriculum concepts, then have students work on solving these problems using the concepts they have studied.
5. Practical experiments and laboratories: Practical experiments can be organized in the laboratory that help students apply theoretical concepts in a practical way and understand how chemical reactions occur.
6. Use of technology: Technological tools such as graphic patterns and digital simulations can be used to illustrate concepts and processes.
7. Modeling and Simulation: Use modeling and simulation software to represent complex chemical processes and enable students to interact with them.
8. Flipped learning: Let students explore concepts in advance and come to class prepared to discuss and apply those concepts.
9. Practical activities: Provide activities that include practical matters such as a private combustion experiment, and analysis and interpretation of experimental results.

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Introduction to Fuel and Combustion: Basics of combustion, types of fuels, and their importance in energy generation.	1	2	1
Quizzes and Tests	Lectures	Types of Fuels: Exploration of various types of fuels, including fossil fuels (coal, oil, natural gas) and alternative fuels (biofuels, hydrogen, etc.).	1	2	2
Feedback and Formative Assessment	Lectures	Chemistry of Combustion: Understanding the chemical reactions involved in combustion, including the oxidation of fuels and the production of combustion products.	1	2	3

Feedback and Formative Assessment	Lectures &Active Learning	Stoichiometry of Combustion: Study of the balanced chemical equations representing combustion reactions and the calculation of reactants and products.	3	2	4
Observations	Lectures &Active Learning	Heat of Combustion and Calorimetry: Concepts related to measuring and calculating the heat released during combustion reactions and the use of calorimetry.	3	2	5
Self-Assessment	Lectures &Active Learning	Actual Cycle Engine & Working Principles	3	2	6
Peer Assessment	Flipped Classroom	Flame and Flame Structure: Examination of flame characteristics, types of flames, and factors influencing flame behavior.	3	2	7
Examinations	Flipped Classroom	Internal Combustion Engines: In-depth look into the principles of internal combustion engines, their types (spark-ignition, compression-ignition), and their efficiency.	4	2	8
Peer Assessment	Flipped Classroom	External Combustion Processes: Study of external combustion processes such as steam power generation, gas turbines, and their applications.	4	2	9

Portfolios	Inquiry-Based Learning	Combustion Kinetics: Exploration of the rate of combustion reactions, factors affecting it, and how it impacts the efficiency of combustion processes.	4	2	10
Portfolios	Peer Learning	IC-Fuel and combustion Introduction	4	2	11
Assignments and Projects	Reflective Learning & Experimental Learning	Pollution and Emissions: Discussion of the environmental impact of combustion, including emissions of greenhouse gases, particulate matter, and methods to reduce pollutants.	6	2	12
Assignments and Projects	Reflective Learning & Experimental Learning	Energy Conversion and Efficiency: Understanding how combustion is used to convert chemical energy into mechanical work and the importance of efficiency in energy conversion.	6	2	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Advanced Combustion Techniques: Introduction to advanced combustion technologies such as fluidized bed combustion, lean-burn engines, and oxy-fuel combustion.	6	2	14
Examinations		Final Examination	6	2	
Quizzes and Tests	Lectures	Combustion Modeling and Simulation: Overview of computational	1	2	

		methods used to model and simulate combustion processes for optimization and pollution reduction.			
Quizzes and Tests	Lectures	Sustainable Energy Sources: Exploration of renewable energy sources as alternatives to traditional fossil fuels, including solar, wind, and biomass energy.	1	2	
Feedback and Formative Assessment	Lectures	Fuel Cells and Combustion: Introduction to fuel cells as an alternative energy conversion technology and their relationship to combustion processes.	1	2	

11.Course evaluation

1. Written tests: Written tests can be conducted that cover the main concepts in the curriculum. Questions can be various such as optional questions, short answer questions and comprehensive questions.
2. Practical tests: They may include practical tests where students perform applied tasks such as calculating calorific values or analyzing the results of certain experiments.
3. Projects and practical work: Students can be assessed by submitting a project or practical work, such as designing an efficient combustion process or submitting a report on the impact of combustion on the environment.
4. Participation in class and discussion: Students' participation in group activities and discussions in class can be evaluated, and the extent to which they contribute to exchanging ideas and discussions.
5. Evaluating laboratory performance: You may evaluate the performance and practical skills of students as they conduct experiments in the laboratory.
6. Evaluating writing projects and reports: The quality of writing projects and reports completed by students on specific topics can be evaluated.
7. Oral assessment: Oral interviews can be organized with students to discuss curriculum concepts and evaluate their understanding and application abilities.
8. Evaluation of actual performance: Students can be evaluated while performing practical activities such as combustion experiments or interacting with simulators.
9. Summative assessment: This method may be used to assess the overall concept learned from the syllabus and students' progress over time.

12.Learning and teaching resources

Certainly, here are some recommended books that cover the topics related to fuel and combustion: 1."Introduction to Combustion". by Stephen R. Turns This is a comprehensive introductory textbook that covers the fundamentals of combustion processes, including chemical kinetics, thermodynamics, and various combustion technologies. 2."Combustion Engineering Issues for Solid Fuel Systems" by Bruce G. Miller This book focuses on solid fuel combustion processes, discussing the principles, technologies, and environmental considerations for burning solid fuels like coal and biomass. 3."Internal Combustion Engine Fundamentals" by John Heywood While mainly focused on internal combustion engines, this book provides an excellent overview of combustion processes, thermodynamics, and engine performance. 4."Environmental Impact of Energy Consumption and Utilization: An Overview" by Stanislav Boldyryev and Yurij Kozar This book explores the environmental impact of energy consumption, including combustion-related pollution and the development of cleaner technologies. 5.."Introduction to Bioenergy". by Vaughn C. Nelson and Kenneth L. Starcher For those interested in biofuels, this book covers various aspects of bioenergy production, including feedstock selection, conversion processes, and sustainability. 6."Introduction to Renewable Energy." by Vaughn C. Nelson and Kenneth L. Starcher This book provides insights into renewable energy sources such as solar, wind, geothermal, and hydropower, which are essential alternatives to traditional fuels. 7."Combustion Technology: Essentials of Flames and Burners." by A. A. Burluka,	**Required textbooks (methodology, if any)**

Alexander S. Rogachev, and Nickolai M. Rubtsov This book delves into the principles of combustion, including combustion theory, flame structure, and burner technologies. 8."Combustion Science and Engineering." by Kalyan Annamalai, Ishwar K. Puri, and Milind A. Jog This book covers a wide range of topics related to combustion, from the basics to advanced concepts, making it suitable for both beginners and those looking for more in-depth knowledge. 9."Advanced Combustion Science". edited by Kefa Cen and Guoqiang Wang This compilation of chapters from various authors provides insights into cutting-edge combustion research, including advanced combustion modes and technologies. 10."Introduction to Energy and the Environment" by John R. Fanchi and John J. Fanchi While not solely focused on combustion, this book offers a broader understanding of energy and its impact on the environment, including discussions on combustion-related issues.	
Internal Combustion Engine Fundamentals" by John Heywood While mainly focused on internal combustion engines, this book provides an excellent overview of combustion processes, thermodynamics, and engine performance	**Main references (sources)**
"Introduction to Combustion" by Stephen R. Turns This widely used textbook provides a comprehensive introduction to the principles of combustion, covering both the fundamentals and applications of combustion processes.	**Recommended supporting books and references (scientific journals, reports....)**
1.. American Institute of Chemical Engineers (AIChE). -Energy & Fuels Division: Website: [https://www.aiche.org/sbe/divisions/energy-fuels] (https://www.aiche.org/sbe/divisions/energy-fuels) AIChE provides resources, articles, and information about energy, fuels, and combustion from a chemical engineering perspective.	**Electronic references, Internet sites**

2..Combustion Institute.: Website: [http://www.combustioninstitute.org/] (http://www.combustioninstitute.org/) The Combustion Institute is an international, non-profit, scientific and educational organization that promotes research and dissemination of combustion science. 3.. National Renewable Energy Laboratory (NREL): Website: [https://www.nrel.gov/] (https://www.nrel.gov/) NREL offers research, data, and insights on renewable energy technologies, including combustion-related aspects of bioenergy and other sustainable energy sources. 4.. US Department of Energy (DOE) - Energy Efficiency & Renewable Energy (EERE): Website: [https://www.energy.gov/eere] (https://www.energy.gov/eere) The EERE division of the DOE focuses on energy efficiency and renewable energy technologies, including clean combustion and alternative fuels. 5.. American Society of Mechanical Engineers (ASME) - Combustion, Fuels, and Emissions Committee.: Website: [https://www.asme.org/codes-standards/committees/codes-and-standards/Combustion-Fuels-Emissions] (https://www.asme.org/codes-standards/committees/codes- and-standards/Combustion-Fuels-Emissions) ASME's committee addresses standards and research related to combustion, fuels, and emissions. 6.. Air & Waste Management Association (AWMA): Website: [https://www.awma.org/] (https://www.awma.org/) AWMA focuses on environmental management and regulation, including air quality, emissions, and combustion-related pollution control. 7.. European Combustion Institute (ECI): Website: [https://www.europeancombustionmeeting.org/] (https://www.europeancombustionmeeting.org/)	

ECI organizes events and provides resources for researchers and professionals in the field of combustion. 8..International Flame Research Foundation (IFRF): Website: [https://ifrf.net/] (https://ifrf.net/) IFRF focuses on combustion research, providing resources, publications, and knowledge-sharing platforms. 9.. United Nations Framework Convention on Climate Change (UNFCCC): Website: [https://unfccc.int/] (https://unfccc.int/) UNFCCC addresses climate change and emissions reduction, offering insights into international efforts to mitigate the environmental impact of combustion processes.	

Electrical Machines

Course description form

1. Course Name
Electrical Machines
2. Course Code
Em En Emi 303604 (2+2
3. Semester/year
First semester/ 2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45hour
7. Name of the course administrator (if more than one name is mentioned)
Name: Assistant Lecturer Omar Ahmed Naeim- Master's drgree email:
8. Course objectives

• This course description provides a necessary summary of the most important course • characteristics of the Electrical machines I and the expected learning outcomes of the • student, demonstrating whether he has made the most of the available learning • opportunities. It must be linked to the program description.	Objectives of the study subject

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Introduction to AC Machine	1	3	1
Discussion and feedback from the student	Lectures	Energy Conversion	1	3	2
Tests	Lectures	AC winding design	2	3	3
Tests	Lectures	Rotating Magnetic Field	1&2	3	4-
Tests	Lectures	Magnetomotive Force (mmf) of AC Windings	1&2	3	5-
Discussion and feedback from the student	Lectures	Synchronous Generators	1&2	3	6-
Discussion and reports	Lectures	Round Rotor Machines	1&2	3	7-

Tests	Lectures	Synchronous generator equivalent circuit	3	3	8-
Tests	Lectures	Mid –term Exam	1&2	3	9-
Discussion and feedback from the student	Lectures	Synchronous Motors	3	3	10-
Discussion and reports	Lectures	Synchronous Motor equivalent circuit	3	3	11-
Tests	Lectures	Induction generator	3	3	12-
Discussion and reports	Lectures	Induction Motors	3	3	13-
Discussion and reports	Lectures	Speed control of induction motor	3	3	14-
Tests	Lectures	Induction Regulator	3	3	15-

11.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

12.Learning and teaching resources

	Required textbooks (methodology, if any)
Alternating Current Machines Pitman Pub,M.G.Say Theory of AC Machinery McGRAW-Hill Pub,A.S	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

English language III

Course descripttion form

13.Course Name
English language **III**

14.Course Code
Em En Ei 30 4917(2+0)
15.Semester/year
First semester/ 2024-2025
16.Date this description was prepared
1-9-2023
17.Available attendance forms
Weekly
18.Number of study hours (total)/number of units (total)
30hour
19.Name of the course administrator (if more than one name is mentioned)
Name: Assistant Lecturer Rusul Dawood Salman- Master's drgree email:
20.Course objectives

• The ability to understand the uses of language in the light of purposes. • 2) Identifying the most important daily phrases to be applicable in life • Students will give oral presentations and receive feedback on their performance	**Objectives of the study subject**

21.Teaching and learning strategies	
1. Lectures and Seminars 2. The Audio method 3. Assessment for Learning 4. Community Language learning 5. Communicative Language teaching 6. Take-based Approach	**The strategy**

22.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Feedback	Lectures	Introductory Lecture	1	2	1
Quizzes and Tests	Lectures	Speaking (paired choice)	1	2	2

		asking about the general opinions about possible issues			
Feedback and Formative Assessment	Lectures	Making conversations	1	2	3
Feedback and Formative Assessment	Lectures & discussions	Phrasal verbs	3	2	4
Observations	Lectures & oral practicing	Listening to engineering conversations to obtain a wide vocabulary	3	2	5
Self-assessment	Lectures & Active Learning	Correcting Mistakes	3	2	6
Peer Assessment	Practicing Language	Mid-term Exam	3	2	7
Examinations		Writing (learning students how to write essays on the engineering field)	4	2	8
Peer Assessment	Lecture and test	Linking Words	4	2	9
Portfolios	Inquiry-Based Learning	Everyday conversation	4	2	10
Portfolios	Peer learning	Auxiliary Verbs	4	2	11
Assignments and Projects	Reflective Learning & Experimental Learning	Conjunctions	6	2	12
Assignments and Projects	Reflective Learning & Experimental Learning	Pronunciation	6	2	13
Rubrics and Criteria-	Reflective Learning &	Practice Language	6	2	14

Based Assessments	Experimental Learning				
Examinations		Final Examination	6	2	15

23.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

24.Learning and teaching resources

▪ New Headway Plus intermediate ▪ The author: John & Liz Soars TOEFL Practice Online The official practice test that can help you go anywhere	**Required textbooks (methodology, if any)**
The Cambridge Encyclopedia of the English Language By David Crystal	**Main references (sources)**
Ciedupress.com/journal/index.php/wjel	**Recommended supporting books and references (scientific journals, reports....)**
https://www.cambridge.org	**Electronic references, Internet sites**

Design of machine parts

Course description form

25.Course Name
Mechanical Element Design
26.Course Code
Em En Mdi 303503 (2+0)
27.Semester/year
First semester 2024-2-25
28.Date this description was prepared
1-9-2023
29.Available attendance forms
Weekly
30.Number of study hours (total)/number of units (total)
45hour
31.Name of the course administrator (if more than one name is mentioned)

Name: Lecturer Ahmed Walid Hussein - Ph.D	Email:

32.Course objectives

• To introduce the student to the analyzes and calculations necessary to design various mechanical parts that are under the influence of various static or dynamic loads..	Objectives of the study subject

33.Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

34.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Review the basic stresses	1	3	1
Discussion and feedback from the student	Lectures	Review of combined stresses and Moore's circle	1	3	2
Tests	Lectures	Types of forces and classification of materials	2	3	3
Tests	Lectures	Failure of ductile materials under static loads	1 & 2	3	4-5
Tests	Lectures	Failure of brittle materials under static loads	1 & 2	3	6
Discussion and feedback from the student	Lectures	Fatigue and finding a bend SN for materials	1 & 2	3	7-8
Discussion and reports	Lectures	Failure of mechanical parts due to fatigue	1 & 2	3	9-11

Tests	Lectures	Design of axles under different loading conditions	3	3	12
Tests	Lectures	Design of columns under different loads	3	3	13
Discussion and feedback from the student	Lectures	Design of welded joints under different loading conditions	3	3	14-15

35.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

36.Learning and teaching resources

Mechanical Engineering Design, J. Shigley, Eighth Edition, 2008 Machine design: an integrated approach, Norton, 3rd edition, 2006	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Store energy

Course description form

1. Course Name
Energy Storage Systems
2. Course Code
Em En Wmi 304008 (2+0)
3. Semester/year

First semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
30 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Professor Wathiq Nasser Hussein - Ph.D Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety	**Objectives of the study subject**

and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies	
1. Lectures and seminars 2. Problem-based learning 3. Project-based learning 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Experiential learning/experiential learning	**The strategy**
10.Course structure	

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Introduction to energy storage	1 &2	2	1
Discussion and feedback from the student	Lectures and discussion	Thermal storage	1&2	4	2
Tests	Lectures and discussion	Thermal storage	1	4	3
Tests	Lectures	Thermal storage	3	4	4
Tests	Lectures and discussion	Thermal storage	3	4	5
Discussion and feedback from the student	Lectures	Electrical storage	3	4	6
Discussion and reports	Lectures and discussion	Electrical storage	3	4	7
Tests	Lectures	Hydroelectric storage	4	4	8
discussion	Lectures	Mechanical storage	4	4	9
Discussion and feedback from the student	Lectures	Mechanical storage	4	4	10
Tests	Lectures and discussion	Bioenergy storage	4	4	11
Tests	discussion	Chemical energy storage	6	4	12
Tests	Lectures	Chemical energy storage	5&6	4	13
Discussion and feedback from the student	Lectures	Chemical energy storage	6&7	4	14
Examinations		Final Examination	5,6 and 7	2	
11.Course evaluation					
. Tests and exams 2. Discussion 3.Homework					

3. Oral presentations and defense of reports or the proposed project 4. Feedback from students	
12.Learning and teaching resources	
1-Energy storage by Huggins R 2-Energy Production, Conversion, Storage, Conservation, and Coupling by Yasar Dimirel	**Required textbooks (methodology, if any)**
THERMAL ENERGYSTORAGE SYSTEMS AND APPLICATIONS, SECOND EDITION By Ibrahim Dincer	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Machine systems design

Course description form

1. Course Name	
Mechanical System Design	
2. Course Code	
Em En MDii 304311 (2+0)	
3. Semester/year	
Second semester|2024-2025	
4. Date this description was prepared	
1-9-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
45hour	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Assistant Lecturer Ahmed Ali Tuman- Master's drgree Email:	
8. Course objectives	
• To introduce the student to the analyzes and calculations necessary to design various	**Objectives of the study subject**

mechanical parts that are under the influence of various static or dynamic loads..	

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Design of bolt connections under different loads	1&2&3	3	1-3
Discussion and feedback from the student	Lectures	Design of springs under different loads	1&2&3	3	4-6
Tests	Lectures	Design of conveyor belts under different loads	1&2&3	3	7-8
Tests	Lectures	Gears, their types and uses	1&2&3	3	9
Tests	Lectures	Design of straight gears	1&2&3	3	10
Discussion and feedback from the student	Lectures	Inclined gear design	1&2&3	3	11
Discussion and reports	Lectures	Design of gear boxes (clutch system)	1&2&3	3	12
Tests	Lectures	Brake design	1&2&3	3	13-14
Tests	Lectures	Case study	1&2&3	3	15

11.Course evaluation

1. Tests and examinations
2. Discussion

3. Oral presentations and defense of reports or the proposed project 4. Feedback from students	
12.Learning and teaching resources	
Mechanical Engineering Design, J. Shigley, Eighth Edition, 2008 Machine design: an integrated approach, Norton, 3rd edition, 2006	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Internal combustion engines IC

Course description form

1. Course Name	
Internal combustion engines	
2. Course Code	
Em In Icii 304513 (2+2)	
3. Semester/year	
Second semester|2024-2-2025	
4. Date this description was prepared	
1-6-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
30 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Fouad Abdel Amir Khalaf - Ph.D Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering.	**Objectives of the study subject**

- Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders.
- Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001).
- Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.
- Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

9. Teaching and learning strategies

1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Introduction to IC engine and combustion technology	1	2	1
Quizzes and Tests	Lectures	Classification of convention External and Internal engines	1	2	2
Feedback and Formative Assessment	Lectures	Strokes in two and four stroke engine +main parts of IC engine	1	2	3
Feedback and Formative Assessment	Lectures &Active Learning	Air standard cycle Otto-cycle and Diesel-cycle	3	2	4
Observations	Lectures &Active Learning	Air standard cycle Duel-cycle and Bryton cycle	3	2	5
Self-Assessment	Lectures &Active Learning	Actual Cycle Engine & Working Principles	3	2	6
Peer Assessment	Flipped Classroom	Engine parameters + engine nomenclatures	3	2	7
Examinations	Flipped Classroom	Engine performance parameter I	4	2	8
Peer Assessment	Flipped Classroom	Engine performance parameter II	4	2	9
Portfolios	Inquiry-Based Learning	Engine with turbocharger performance	4	2	10

Portfolios	Peer Learning	IC-Fuel and combustion Introduction	4	2	11
Assignments and Projects	Reflective Learning & Experimental Learning	Fuel types + fuel classification	6	2	12
Assignments and Projects	Reflective Learning & Experimental Learning	Combustion stages ignition timing	6	2	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Ic -Emissions and pollution	6	2	14
Examinations		Final Examination	6	2	
Quizzes and Tests	Lectures	Introduction to combustion technology engine classification	1	2	
Quizzes and Tests	Lectures	Air standard cycle +engine performance	1	2	
Feedback and Formative Assessment	Lectures	Fuel types +combustion stages	1		

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Engineering Fundamentals of the Internal Combustion Engine" by Willard W. Pulkrabek. University of Wisconsin-·. Platteville IC Engines. Fourth Edition by V Ganesan. Professor Emeritus. Department of Mechanical Engineering. Indian Institute of Technology Madras Chennai.	**Required textbooks (methodology, if any)**
Fundamentals of internal combustion engine by gupta	**Main references (sources)**
https://testbook.com/question-answer/which-one-of-the-components-is-sometimes-called-l--5bff733e80df4a0c8d8d8734	**Recommended supporting books and references (scientific journals, reports....)**

https://en.wikipedia.org/wiki/Internal_combustion_engine	**Electronic references, Internet sites**

Electrical power systems I

Course description form

1. Course Name
Electrical power systems I
2. Course Code
Em En Epi 303806 (2+0)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45hour
7. Name of the course administrator (if more than one name is mentioned)
Name: Assistant Professor Ali Sabry Alo - Ph.D Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and	**Objectives of the study subject**

other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	
9. Teaching and learning strategies	
1.Method of giving lectures. 2.Student groups. 3.workshops. 4.Scientific trips to follow up on the practical reality of relevant companies.	The **strategy**

5.E-learning inside and outside the university campus.	

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
feedback	a lecture	Electrical power generator	1	3	1
feedback	a lecture	Structure of electrical power system	1	3	2
feedback	a lecture	Location of power station	1	3	3
Exam	a lecture	Load curve and factors	3	3	4
Homework	a lecture	Power transmission	3	3	5
Feedback	a lecture	Conductor materials	3	3	6
Feedback	a lecture	Parameter of overhead transmission line	3	3	7
Semester exam	a lecture	Mid-term Exam	4	3	8
Feedback	a lecture	Mechanical design of transmission line	4	3	9
Feedback	a lecture	Distribution inside large building	4	3	10
Exam	a lecture	Constructor defiles of 33/11kV & 11/0.4 kV distribution systems	4	3	11
Feedback	a lecture	Emergency generators	6	3	12
Homework	a lecture	Unitrubtiptible power system (UPS)	6	3	13
Feedback	a lecture	Reactive power control in distribution network	6	3	14
Feedback	a lecture	Distribution system configuration	6	3	15

11.Course evaluation

1- Exams
2- Evaluation Continuous
3- Reports
4- Stimuli
5- nutrition Feedback from students

12.Learning and teaching resources

Electrical power systems. {A.E. Guile, W. Paterson} Volume one 2- Elements of power system analysis. {William D.	**Required textbooks (methodology, if any)**

Stevenson, SR.} 3- A course in electrical power. {ML Soni and PV Gupta}.	
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Transfer of mass and heat
Course description form

1. Course Name	
Heat and mass transfer I	
2. Course Code	
Em En Hti 303501 (2+2)	
3. Semester/year	
First semester|2023-2024	
4. Date this description was prepared	
1-6-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
45 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Aws Abdul Mahmoud - Ph.D Email:	
8. Course objectives	
• Introducing the student to the mechanisms of heat transfer and methods of calculating it • The student analyzes and calculates thermal loads for various engineering applications	**Objectives of the study subject**
9. Teaching and learning strategies	

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Weekly exams - pre and post questions	Theoretical lecture	Introduction heat transfer mechanisms	1	3	1
Weekly exams - pre and post questions	Theoretical lecture	Conduction heat transfer	1	3	2
Weekly exams - pre and post questions	Theoretical lecture	Introduction to convection heat transfer	1&2	3	3
Weekly exams - pre and post questions	Theoretical lecture	Examples	1&2	3	4
Weekly exams - pre and post questions	Theoretical lecture	Thermal resistance networks	1&2	3	5
		Exam	1&2	3	6
Weekly exams - pre and post questions	Theoretical lecture	Introduction to radiation heat transfer	1&2	3	7
Weekly exams - pre and post questions	Theoretical lecture	Radiation heat transfer	1&2	3	8
Weekly exams - pre and post questions	Theoretical lecture	Two-Dimensional Heat Transfer 1	1&2	3	9

Weekly exams - pre and post questions	Theoretical lecture	Two-dimensional heat transfer 2	1&2	3	10
		Exam	1&2	3	11
Weekly exams - pre and post questions	Theoretical lecture	Unsteady heat transfer	1&2	3	12
Weekly exams - pre and post questions	Theoretical lecture	Heat transfer with heat generation	1&2	3	13
		Exam	1&2	3	14
Weekly exams - pre and post questions	Theoretical lecture	Review	2		15

11.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

12.Learning and teaching resources

Fundamental of heat and mass transfer, Incropira, 7th Ed	**Required textbooks (methodology, if any)**
Heat Transfer a practical approach, Yunis A. Cengel 3rd Ed	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Electrical power systems II

Course description form

13.Course Name

Electrical power systems I

14.Course Code

Em En Epii 304614 (2+0)

15.Semester/year

Second semester|2024-2025
16.Date this description was prepared
1-9-2023
17.Available attendance forms
Weekly
18.Number of study hours (total)/number of units (total)
45hour
19.Name of the course administrator (if more than one name is mentioned)
Name: Assistant Professor Ali Sabry Alo - Ph.D Email:
20.Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific	**Objectives of the study subject**

capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.

- Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

21.Teaching and learning strategies

1.Method of giving lectures. 2.Student groups. 3.workshops. 4.Scientific trips to follow up on the practical reality of relevant companies. 5.E-learning inside and outside the university campus.	The **strategy**

22.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
feedback	a lecture	Electrical power generator	1	3	1
feedback	a lecture	Structure of electrical power system	1	3	2
feedback	a lecture	Location of power station	1	3	3
Exam	a lecture	Load curve and factors	3	3	4
Homework	a lecture	Power transmission	3	3	5
Feedback	a lecture	Conductor materials	3	3	6

Feedback	a lecture	Parameter of overhead transmission line	3	3	7
Semester exam	a lecture	Mid-term Exam	4	3	8
Feedback	a lecture	Mechanical design of transmission line	4	3	9
Feedback	a lecture	Distribution inside large building	4	3	10
Exam	a lecture	Constructor defiles of 33/11kV & 11/0.4 kV distribution systems	4	3	11
Feedback	a lecture	Emergency generators	6	3	12
Homework	a lecture	Unitrubtiptible power system (UPS)	6	3	13
Feedback	a lecture	Reactive power control in distribution network	6	3	14
Feedback	a lecture	Distribution system configuration	6	3	15

23.Course evaluation

1- Exams
2- Evaluation Continuous
3- Reports
4- Stimuli
5- nutrition Feedback from students

24.Learning and teaching resources

Electrical power systems. {A.E. Guile, W. Paterson} Volume one 2- Elements of power system analysis. {William D. Stevenson, SR.} 3- A course in electrical power. {ML Soni and PV Gupta}.	**Required textbooks (methodology, if any)**
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Mass transfer and the heat II

Course description form

1. Course Name

heat transfer and the mass II

2. Course Code

Em Ht Maii 304109 (2+2)

3. Semester/year

Second semester|2024-2025

4. Date this description was prepared

1-6-2023

5. Available attendance forms

Weekly

6. Number of study hours (total)/number of units (total)

45 hours

7. Name of the course administrator (if more than one name is mentioned)

Name: Lecturer Aws Abdul Mahmoud - Ph.D Email:

8. Course objectives

• Introducing the student to the mechanisms of heat transfer and methods of calculating it • The student analyzes and calculates thermal loads for various engineering applications • Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of	**Objectives of the study subject**

professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001).

- Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.
- Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

9. Teaching and learning strategies

. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Weekly exams - pre and post questions	Theoretical lecture	Introduction to convection heat transfer	1	3	1

Weekly exams - pre and post questions	Theoretical lecture	Forced Convection Heat Transfer	1	3	2
Weekly exams - pre and post questions	Theoretical lecture	Internal flow convection heat transfer +examples	1&2	3	3
Weekly exams - pre and post questions	Theoretical lecture	External Flow heat transfer + examples	1&2	3	4
Weekly exams - pre and post questions	Theoretical lecture	Natural convection	1&2	3	5
		Exam	1&2	3	6
Weekly exams - pre and post questions	Theoretical lecture	Heat Exchangers 1	1&2	3	7
Weekly exams - pre and post questions	Theoretical lecture	Heat exchangers 2	1&2	3	8
Weekly exams - pre and post questions	Theoretical lecture	Two-Dimensional Heat Transfer 1	1&2	3	9
Weekly exams - pre and post questions	Theoretical lecture	Two-dimensional heat transfer 2	1&2	3	10
		Exam	1&2	3	11
Weekly exams - pre and post questions	Theoretical lecture	Boiling and condensation	1&2	3	12
Weekly exams - pre and post questions	Theoretical lecture	Cooling of electronic equipment	1&2	3	13
		Exam	1&2	3	14
Weekly exams - pre	Theoretical lecture	Review	2		15

and post questions					

11.Course evaluation
1. Tests and examinations 2. Discussion 3. Oral presentations and defense of reports or the proposed project 4. Feedback from students

12.Learning and teaching resources	
Fundamental of heat and mass transfer, Incropira, 7th Ed	**Required textbooks (methodology, if any)**
Heat Transfer a practical approach, Yunis A. Cengel 3rd Ed	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Engineering analyses

Course description form

1. Course Name
Engineering analyses
2. Course Code
Em En Eai 303402 (2+0)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45hour
7. Name of the course administrator (if more than one name is mentioned)
Name: Assistant Professor Bashar Abed Hamza - Ph.D Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.	**Objectives of the study subject**

• Active contribution to community service activities.	

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	First order differential equations	1	3	1
Discussion and feedback from the student	Lectures	First order differential equations	1	3	2
Discussion and feedback from the student	Lectures	First order differential equations	1	3	3
Tests	Lectures	Second-order differential equations with constant coefficients	1 & 2	3	4
Tests	Lectures	Second-order differential equations with constant coefficients	1 & 2	3	5
Tests	Lectures	Second-order differential equations with constant coefficients	1 & 2	3	6
Tests	Lectures	Series differential equations	1 & 2	3	7

Tests	Lectures	Series differential equations	1 & 2	3	8
Discussion and feedback from the student	Lectures	Fourier series	1 to 3	3	9
Discussion and feedback from the student	Lectures	Fourier series	1 to 3	3	10
Tests	Lectures	Fourier series	1 to 3	3	11
Tests	Lectures	Partial differential equations and boundary value problems	1 to 4	3	12
Discussion and feedback from the student	Lectures	Partial differential equations and boundary value problems	1 to 4	3	13
Discussion and feedback from the student	Lectures	Partial differential equations and boundary value problems	1 to 4	3	14
Discussion and feedback from the student	Lectures	Partial differential equations and boundary value problems	1 to 4	3	15

11.Course evaluation

1. Tests and examinations
2. Homework
3. Discussion
4. Oral presentations and defense of reports or the proposed project
5. Feedback from students

12.Learning and teaching resources

Advanced engineering mathematics, C.RAY WYLIE. 5th edition, 1982.	**Required textbooks (methodology, if any)**
Advanced engineering mathematics, Kreyszig, 2006.	**Main references (sources)**

	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Numerical Analysis

Course description form

13.Course Name	
Numerical Analysis	
14.Course Code	
Em En Naii 304210 (2+0)	
15.Semester/year	
Second semester|2024-2025	
16.Date this description was prepared	
1-9-2023	
17.Available attendance forms	
Weekly	
18.Number of study hours (total)/number of units (total)	
45hour	
19.Name of the course administrator (if more than one name is mentioned)	
Name: Assistant Professor Qais Hatem Al-Madhlom - Ph.D Email:	
20.Course objectives	
• A numerical analysis course aims to teach students how to design, analyze, and implement algorithms for obtaining approximate yet accurate numerical solutions to complex mathematical problems that are impossible to solve analytically. Key goals include understanding error analysis (round-off/truncation), numerical stability, algorithm efficiency, and applying these techniques to linear algebra, root-finding, interpolation, and differential equations. • • Core Topics Mastery: Gain proficiency in key numerical techniques, including:	**Objectives of the study subject**

- Root-finding: Modified Newton-Raphson method.
- Linear Algebra: LU factorization, Gaussian elimination, eigenvalues.
- Interpolation/Approximation (Curve fit): Polynomial interpolation, least-squares method.
- Numerical Calculus: Differentiation and integration (quadrature).
- Ordinary Differential Equations ODE of type Initial Value Problem IVP: Euler's methods, Modified Euler's method, Runge-Kutta.
- Ordinary Differential Equations ODE of type Boundary Value Problem BVP: Finite differences: Standard form, and Diagonal form.
- Partial Differential Equation PDE of types Elliptic and Parabolic: Taking examples of Laplace and Poisson equation for the Elliptic type and Conduction Heat equation in one direction for the Parabolic type.

21.Teaching and learning strategies

1.Lectures. 2. Student groups. 3. Workshops 4. E-learning inside and outside the university campus. 5. Experiential learning.	**The strategy**

22.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Root-finding	1,2,3,4	4	1
Discussion and feedback from the student	Lectures	Linear Algebra	1,2,3,4	4	2
Discussion and feedback from the student	Lectures	Approximation (Curve)	1,2,3,4	4	3
Tests	Lectures	Interpolation	1,2,3,4	4	4
Tests	Lectures	Interpolation	1,2,3,4	4	5
Tests	Lectures	Differentiation	1,2,3,4	4	6

Tests	Lectures	Integration	1,2,3,4	4	7
Tests	Lectures	ODE(IVP)	1,2,3,4	4	8
Discussion and feedback from the student	Lectures	ODE(IVP)	1,2,3,4	4	9
Discussion and feedback from the student	Lectures	ODE(IVP)	1,2,3,4	4	10
Tests	Lectures	ODE(IVP)	1,2,3,4	4	11
Monthly exam	Monthly exam	Monthly exam	Monthly exam	4	12
Discussion and feedback from the student	Lectures	Laplace and poisson equation	1,2,3,4	4	13
Discussion and feedback from the student	Lectures	Conduction Heat equation	1,2,3,4	4	14
Mid exam	Mid exam	Mid exam	Mid exam	4	15

23.Course evaluation

1- Exams
2- Continuous evaluation
3- Reports
4- Stimulation
5- Feedback from students

24.Learning and teaching resources

.	**Required textbooks (methodology, if any)**
Sastry, S.S., 2012. Introductory methods of numerical analysis. PHI Learning Pvt. Ltd..	**Main references (sources)**
* Sauer, T., 2012, Numerical analysis, 2nd ed., Pearson Education, Inc. * Richard L. Burden, J. Douglas Faires, Annette M. Burden, 2016, Numerical Analysis, Tenth Edition, Cengage Learning	**Recommended supporting books and references (scientific journals, reports....)**
1- 3Blue1Brown, Linear Algebra, https://www.3blue1brown.com/ 2- Algebra, https://www.whyu.org/ 3- Applied Math, https://www.youtube.com/@zachstar	**Electronic references, Internet sites**

4- Numerical Methods Made Easy – Full Course (Part 1), https://www.youtube.com/@StudySessionYT 5- LibreTexts MATHAMATICS, https://math.libretexts.org/ Electronic references, websites	

Waste management and energy recovery

Course description form

1. Course Name	
Waste management and energy recovery	
2. Course Code	
Em En Wmi 303907 (2+0)	
3. Semester/year	
Second semester|2024-2025	
4. Date this description was prepared	
1-9-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
30 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Professor Wathiq Nasser Hussein - Ph.D Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international	**Objectives of the study subject**

standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	
9. Teaching and learning strategies	

1. Lectures and seminars 2. Problem-based learning 3. Project-based learning 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Discussion	Lectures	introduction	1 &2	2	1
Discussion and feedback from the student	Lectures and discussion	Types and Composition of Solid Wastes	1&2	2	2
Tests	Lectures and discussion	=	1	2	3
Tests	Lectures	Composition of solid wastes and their determination	3	2	4
Tests	Lectures and discussion	Composition of solid wastes and their determination	3	2	5
Discussion and feedback from the student	Lectures	Separation, processing and transformation of solid waste	3	2	6
Discussion and reports	Lectures and discussion	Separation, processing and transformation of solid waste+1st exam	3	2	7
Tests	Lectures	SANITARY AND BIOREACTOR LANDFILLS	4	2	8
Discussion	Lectures	SANITARY AND BIOREACTOR LANDFILLS	4	2	9
Discussion and feedback from the student	Lectures	Biogas Characteristics	4	2	10
Tests	Lectures and discussion	Biogas characteristic	4	2	11
Tests	discussion	Energy recovery comparison	6	2	12
Tests	Lectures	Energy waste in firing system	5&6	2	13
Discussion and feedback from the student	Lectures	Energy waste in firing system	6	2	14
Examinations		Final Examination	5,6	2	

11.Course evaluation	
1. Tests and examinations 2. Discussion 3.Homework 3. Oral presentations and defense of reports or the proposed project 4. Feedback from students	
12.Learning and teaching resources	
1.Waste Management by Er Sunil Kumar 2. Solid Waste Management; LECTURE NOTES 3. Solid wastes Problem and Benefits by Watheq N. Hussein	**Required textbooks (methodology, if any)**
1.Energy Production, Conversion, Storage, Conservation, and Coupling by Yasar Dimirel 2. Solid wastes Problem and Benefits by Wateq N. Hussein solid Waste Management; LECTURE NOTES	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Solar energy

Course description form

rse Name
energy
rse Code
Seii 304412 (1+2)
este /year
d semester|2024-2025
e this description was prepared
023
ilable attendance forms
y

nber of study hours (total)/number of units (total)

r

ne of the course administrator (if more than one name is mentioned)

Name Assistant Professor Ali Jaber Abdel Hamid - Ph.D Email:

rse objectives

Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. Active contribution to community service activities.	**Objectives of the study subject**

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rkshops.
entific trips to follow up on the practical reality of relevant companies.
earning on and off campus.
periential learning

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urse structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	v
Feedback	a lecture	Solar radiation & solar time	1	3	
Feedback	a lecture	Solar angle	1	3	
Feedback	a lecture	Radiation on Horizontal and inclined plane	1	3	

Exam	a lecture	Design of solar systems, Flat plate collector (FPC)	3	3	
Homework	a lecture	Parabolic trough collector (PTC)	3	3	
Feedback	a lecture	Receiver tube in PTC	3	3	
Feedback	a lecture	Geometry analysis of PTC	3	3	
Semester exam	a lecture	Mid-term Exam	4	3	
Feedback	a lecture	Photovoltaic Panels PV	4	3	
Feedback	a lecture	Design of PV array	4	3	
Exam	a lecture	Basics of wind energy conversion	4	3	
Feedback	a lecture	Design of wind generator system, Aerodynamics of wind turbines	6	3	
Homework	a lecture	Rotor design	6	3	
Feedback	a lecture	Measurement of wind	6	3	
Feedback	a lecture	Wind electric generators	6	3	

urse evaluation

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dback from students

arning and teaching resources

	Required textbooks (methodology if any)
Engineering of Thermal Processes, Photovoltaic and Wind	**Main reference (sources)**
	Recommended supporting books and reference (scientific journals, reports...
ndl.ethernet.edu.et/bitstream/123456789/87792/1/A.Duffie%205th%20edition_compressed.pdf	**Electronic reference Internet**

Nanotechnology and nanomaterial

Course description form

1. Course Name	
Nanotechnology and Nanomaterials	
2. Course Code	
Em En Nnii 304715 (2+0)	
3. Semester/year	
Second semester|2024-2025	
4. Date this description was prepared	
1-9-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
30 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Assistant Professor Wissam Jalil Khudair - Ph.D Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness	**Objectives of the study subject**

of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001).

- Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.
- Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

9. Teaching and learning strategies

The strategy	
1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Introduction to nanotechnology	1	2	1
Discussion and feedback from the student	Lectures	Classification of nanomaterials	3, 4, and 6	2	2-3
Tests	Lectures	Thin film deposition	2	2	4-5
Tests	Lectures	Manufacture of nanomaterials by physical vapor deposition methods	1 and 2	2	6-7
Tests	Lectures	Manufacture of nanomaterials by	1 and 2	2	8-9

		chemical vapor deposition methods			
Discussion and feedback from the student	Lectures	Carbon nanotubes	1-4, and 6	2	10-11
Interactive discussion	Lectures	Methods for examining nanomaterials 1	1-4, and 6	2	12-13
Reports and presentations	Lectures	Methods for examining nanomaterials 2	1-4, and 6	2	14-15

11.Course evaluation	
1. Tests and examinations 2. Discussion 3. Oral presentations and defense of reports or the proposed project 4. Feedback from students	
12.Learning and teaching resources	
1.Handouts from different references 2.Introduction to Nanoscale Science and Technology", Edited by Massimiliano Di Ventra, Stephane Evoy, and James R. Heflin, Jr. (Springer, 2004), ISBN: 1-4020-7720-3	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Hydrogen energy and fuel cells

Course description form

1. Course Name
Hydrogen energy and fuel cell technology
2. Course Code
Em En Heii 304816 (1+2)
3. Semester/year
First semester|2024-2025

4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
75hour
7. Name of the course administrator (if more than one name is mentioned)
Name: Assistant Professor Wissam Jalil Khudair - Ph.D Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	**Objectives of the study subject**

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Workshops and scientific visits 5. E-learning and blended learning 6. Reports 7. Conducting practical experiments in the laboratory	**The strategy**

10. Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Interactive discussion	Lectures (2 theoretical + 1 discussion + 2 practical)	Introduction to hydrogen energy and fuel cell technology	1	5	1
Discussion and feedback from the student	Lectures (2 theoretical + 1 discussion + 2 practical)	Principles of electrochemical engineering 1	2, 4, and 6	5	2
Tests	Lectures (2 theoretical + 1 discussion + 2 practical)	Principles of electrochemical engineering 2	2	5	3
Discussion and feedback from the student	Lectures (2 theoretical + 1 discussion + 2 practical)	Thermodynamics of fuel cells 1	2, 4, and 6	5	4
Tests	Lectures (2 theoretical + 1 discussion + 2 practical)	Thermodynamics of fuel cells 2	2	5	5
Discussion and feedback from the student	Lectures (2 theoretical + 1 discussion + 2 practical)	Reaction kinetics in fuel cells 1	2, 4, and 6	5	6
Tests	Lectures (2 theoretical + 1 discussion + 2 practical)	Reaction kinetics in fuel cells 2	2	5	7
Interactive discussion	Lectures (2 theoretical + 1 discussion + 2 practical)	Reaction kinetics in fuel cells 3	2	5	8
Tests	Lectures (2 theoretical + 1 discussion + 2 practical)	Transition phenomena in fuel cell systems 1	2, 4, and 6	3	9
Interactive discussion	Lectures (2 theoretical + 1 discussion + 2 practical)	Transition phenomena in fuel cell systems 2	2	2	10
Discussion and reports	Lectures (2 theoretical + 1 discussion + 2 practical)	Fuel cell evaluation	3, 4, and 6	2	11
Discussion and reports	Lectures (2 theoretical + 1 discussion)	Fuel cell applications	3, 4, and 6	2	12
Tests	Lectures (2 theoretical + 1 discussion)	Polymeric fuel cell	3	2	13

Tests	Lectures (2 theoretical + 1 discussion)	Storage, production, and transportation of hydrogen	1	2	14
Discussion and reports	Lectures (2 theoretical + 1 discussion)	Fuel cell design	7	2	15

11.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

12.Learning and teaching resources

"Fuel Cell Engines", Matthew M. Mench, 2008 by John Wiley & Sons, Inc.	**Required textbooks (methodology, if any)**
Fuel Cell Handbook (http://www.seca.doe.gov/tutorial/pdf/FCHandbook6.pdf)	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Fourth Stage/ 2025

Power Electronics
Course description form

1. Course Name
Power Electronics
2. Course Code
Em En Pei 405103 (2+2)
3. Semester/year

First semester|2024-2025

4. Date this description was prepared

1-9-2023

5. Available attendance forms

Weekly

6. Number of study hours (total)/number of units (total)

75 hour

7. Name of the course administrator (if more than one name is mentioned)

Name: Assistant Lecturer Ahmed Mohammed Merza– Master's degree
Email:

8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field	**Objectives of the study subject**

visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.

- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

9. Teaching and learning strategies

	The strategy
1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Introduction to Power Electronics	1	5	1
Quizzes and Tests	Lectures	Classification of electronics switching and their uses	1	5	2
Feedback and Formative Assessment	Lectures	Single phase half wave rectifier (Uncontrolled)	1	5	3
Feedback and Formative Assessment	Lectures &Active Learning	Single phase half wave rectifier (Controlled)	3	5	4
Observations	Lectures &Active Learning	Single phase full wave rectifier (Uncontrolled)	3	5	5
Self-Assessment	Lectures &Active Learning	Single phase full wave rectifier (Controlled)	3	5	6
Peer Assessment	Flipped Classroom	Three phase half wave rectifier	3	5	7
Examinations	Flipped Classroom	Three phase full wave rectifier	4	5	8
Peer Assessment	Flipped Classroom	DC Converters/DC	4	5	9
Portfolios	Inquiry-Based Learning	Buck Converter	4	5	10

Portfolios	Peer Learning	Boost Converters	4	5	11
Assignments and Projects	Reflective Learning & Experimental Learning	Introduction to Inverters	6	5	12
Assignments and Projects	Reflective Learning & Experimental Learning	Single Phase inverters	6	5	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Three Phase inverters	6	5	14
Examinations		Final Examination	6	5	15

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Power Electronics, Daniel W. Hart	Required textbooks (methodology, if any)
Power Electronics, Rasheed Mohan	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Nuclear Energy

Course description form

1. Course Name
Nuclear Energy
2. Course Code
Em En Nei 405507 (2+0)
3. Semester/year
First semester|2024-2025

4. Date this description was prepared	
1-9-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
45 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: lecturer Muhannad Jaber Yasser - Master's degree Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of	**Objectives of the study subject**

professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies

1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Atomic and nuclear physics	1	3	1
Quizzes and Tests	Lectures	Mass and energy	1	3	2
Feedback and Formative Assessment	Lectures	Binding energy	1	3	3
Feedback and Formative Assessment	Lectures &Active Learning	Interaction of radiation wit matter	3	3	4
Observations	Lectures &Active Learning	Neutron attenuation	3	3	5
Self-Assessment	Lectures &Active Learning	Problem set_1	3	3	6
Peer Assessment	Flipped Classroom	Neutron diffusion and moderation	3	3	7
Examinations	Flipped Classroom	The equation of continuity	4	3	8
Peer Assessment	Flipped Classroom	Diffusion length	4	3	9
Portfolios	Inquiry-Based Learning	Problem set_2	4	3	10
Portfolios	Peer Learning	Nuclear reactor theory	4	3	11

Assignments and Projects	Reflective Learning & Experimental Learning	Reactor geometries	6	3	12
Assignments and Projects	Reflective Learning & Experimental Learning	One-group critical equation	6	3	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Thermal reactors	6	3	14
Examinations		Final Examination	6	3	15
Quizzes and Tests	Lectures	Atomic and nuclear physics	1	3	16

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition. Nuclear Engineering Handbook, Frank Kreith & Roop Mahajan - Series Editors.	**Required textbooks (methodology, if any)**
Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition.	**Main references (sources)**
Introduction to Nuclear Engineering - UNSW Handbook	**Recommended supporting books and references (scientific journals, reports....)**
https://www.amazon.com/Introduction-Nuclear-Engineering-John-Lamarsh/dp/0201824981	**Electronic references, Internet sites**

Control systems

Course description form

1. Course Name
Control systems
2. Course Code

Em En Csii 405709 (3+0)
3. Semester/year
Second semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Hamed Hussein Hadwan - Master's degree Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.	**Objectives of the study subject**

• Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies

1-Method of giving lectures. 2- Strategy Critical thinking in learning 3- Strategy High thinking 4- Strategy Brainstorming 5- Student groups 6- Workshops 7- Scientific trips to follow up on the practical reality of the nature of the work of energy control systems 8-E-learning on campus 9-Experiential learning	The strategy

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Exams	1- Method of giving lectures	Introduction: Definitions and concepts of autonomous control, classification of control systems	5%	3	1
Continuous evaluation	2- Critical strategy of thinking in learning	Open and closed control systems, feedback concepts, requirements for ideal control systems	5%	3	2
Reports	3- High strategy of thinking	Mathematical modeling, transfer function, mechanical systems modeling, electrical systems, electromechanical systems, thermal systems, hydraulic systems, pneumatic systems, analogue systems: voltage, current	5%	3	3
Motivators	4- strategyBrainstorming	Notable diagrams and flow charts: diagram representation, block function, diagram reduction, notable flow diagrams, and Mason's gain formula.	5%	3	4
Feedback from students	5- TotalsStudents	Response analysisTransient stableAnd the constant: Introduction, standard test	7%	3	5

		contributions, the concept of constant time and its importance in response speed, analysis of first order and second order systems, transient response specifications, system stability analysis - Roth standard			
Exams	6- Workshops	Frequency response analysis using Nyquist plots, polar plots	8%	3	6
Continuous evaluation	7-Scientific trips to follow up on the practical reality of the nature of the work of energy control systems	Nyquist stability criterion, stability analysis, relative stability, gain and phase edge, circuitsM&N	8%	3	7
Reports	8-E-learning on campus	Frequency response analysis using chartsBudd, Budd Dilution Charts, Budd Use Stability Analysis Plots, Budd Simplified Charts, Gain Margin and Phase	8%	3	8
Motivators	9-Experiential learning	Engineering shop location plans: Definition of the engineering shop root, a general ruling in favor of building the engineering shop root, analysis of engineering shop location plans.	7%	3	9
Feedback from students		Function of control and compensation system: types of control devices - proportional-integral-relative-relative-integral derivation	7%	3	10
Feedback from students		Proportional integral differentiable controllers (basic concept only), feedback compensation and series, are natural tools for system compensation.	7%	3	11
Continuous evaluation		Introduction and mathematical representation of the history of robots, types of robots and the numbering, position and orientation of a solid body.	7%	3	12
Reports		Some properties of rotation matrices, successive cycles, Euler traps, fixed frames XYZ and ZYZ effect frame. Conversion between HS, homogeneous counterparts	7%	3	13
Motivators		Features A BT, types of joints: ball joint, cylindrical joint, rotary prismatic joint, representation of connections using Dingt parameters: connection parameters for intermediate, first and last connections, connection transformation matrices.	7%	3	14

Feedback from students		Conversion matrices3R processor, PUMA560 processor, SCARA processor	7%	3	15

11.Course evaluation	
1-Exams 2-Continuous evaluation 3-Reports 4- Motivators 5-Feedback from students	
12.Learning and teaching resources	
1- Control Engineering, Uday A. Bakshi and Varsha U. Bakshi. 2- Control Engineering, D. Ganesh Rao and K. Channa Venkatesh.	**Required textbooks (methodology, if any)**
Feedback and Control Systems, Joseph J. Distefano, Allen R. Stubberud and Ivan J. Williams	**Main references (sources)**
1. Modern Control Engineering, Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., New Delhi	**Recommended supporting books and references (scientific journals, reports....)**
2. Control Systems Principles and Design, M. Gopal, Tata McGraw Hill Publishing Co. Ltd., New Delhi	**Electronic references, Internet sites**

Bioenergy Engineering

Course description form

1. Course Name
Bioenergy Engineering
2. Course Code
Em In Bei 405406 (1+2)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared
4-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45 hours

7. Name of the course administrator (if more than one name is mentioned)	
Name: Assistant Lecturer Dhi Saadi Naji – Master's degree Email:	
8. Course objectives	
• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of	**Objectives of the study subject**

self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies

1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	The strategy

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Some basic concepts and definitions	1	3	1
Quizzes and Tests	Lectures	Biomass types, advantages and drawbacks, characteristics	2	3	2
Feedback and Formative Assessment	Lectures	Biomass types, advantages and drawbacks, characteristics	2	3	3
Feedback and Formative Assessment	Lectures & Active Learning	Classification and assessment of biofuels	3	3	4
Observations	Lectures & Active Learning	Classification and assessment of biofuels	3	3	5
Self-assessment	Lectures & Active Learning	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	6
Peer Assessment	Flipped Classroom	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	7
Examinations	Flipped Classroom	Production of biogas - phases, parameters, types, designs of biogas plants	4	3	8
Peer Assessment	Flipped Classroom	Complete, partial, and perfect biofuel combustion	4.5	3	9
Portfolios	Inquiry-Based Learning	Complete, partial, and perfect biofuel combustion	4.5	3	10
Portfolios	Lectures & Active Learning	Pyrolysis - Types - process Typical yield rates.	5	3	11
Assignments and Projects	Lectures & Active Learning	Pyrolysis - Types - process Typical yield rates.	5	3	12

Assignments and Projects	Lectures & Active Learning	Types, comparisons, applications, performance and economics of gasification	6	3	13
Rubrics and Criteria-Based Assessments	Lectures & Active Learning	Types, comparisons, applications, performance and economics of gasification	6	3	14
Assignments and Projects	Lectures & Active Learning	Revision and project	7	3	15

11.Course evaluation	
1. Continuous calendar 2. Exams 3. Practical evaluations 4. Project evaluation 5. Oral presentations and defense 6. Peer evaluation	
12.Learning and teaching resources	
Nelson, V. C., Starcher, K. L. (2017). Introduction to Bioenergy. United Kingdom: CRC Press.	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Power Plants II
Course description form

1. Course Name
Power Plants II
2. Course Code
Em En Ppii 406113 (1+2)
3. Semester/year
Second semester|2023-2024
4. Date this description was prepared
1-6-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)

45 hours

7. Name of the course administrator (if more than one name is mentioned)

Name: Lecturer Fouad Abdul Ameer Khalaf- Ph.D Email:

8. Course objectives

• Study of space stations. • Study of the main types of steam turbines. • Study of hydroelectric power stations.	**Objectives of the study subject**

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Weekly exams - pre and post questions	Theoretical lecture	Introduction to combined cycle power plant	1	3	1
Weekly exams - pre and post questions	Theoretical lecture	Introduction to steam turbine	1	3	2
Weekly exams - pre and post questions	Theoretical lecture	Classification of steam turbine .	1&2	3	3
Weekly exams - pre and post questions	Theoretical lecture	Steam turbine compounding system	1&2	3	4
Weekly exams - pre	Theoretical lecture	Velocity diagram of simple impulse steam turbine	1&2	3	5

and post questions					
		Exam	1&2	3	6
Weekly exams - pre and post questions	Theoretical lecture	Reaction turbine	1&2	3	7
Weekly exams - pre and post questions	Theoretical lecture	Velocity diagram of reaction turbine	1&2	3	8
Weekly exams - pre and post questions	Theoretical lecture	Reheat factor	1&2	3	9
Weekly exams - pre and post questions	Theoretical lecture	Hydroelectric power plant .	1&2	3	10
	Theoretical lecture	Classification of hydroelectric turbine	1&2	3	11
Weekly exams - pre and post questions	Theoretical lecture	Velocity diagram	1&2	3	12
Weekly exams - pre and post questions	Theoretical lecture	Operation and maintenance of power plant	1&2	3	13
		Exam	1&2	3	14
Weekly exams - pre and post questions	Theoretical lecture	Review	2		15

11.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

12.Learning and teaching resources

• Power plant engineering PK. Nag	**Required textbooks (methodology, if any)**

	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Idustiral Engineering
Course description form

13.Course Name	
Idustiral Engineering	
14.Course Code	
Em En Ieii 405911 (2+0)	
15.Semester/year	
Second semester|2024-2025	
16.Date this description was prepared	
1-6-2023	
17.Available attendance forms	
Weekly	
18.Number of study hours (total)/number of units (total)	
45 hours	
19.Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Ahmed Reyadh Radhi- Ph.D Email:	
20.Course objectives	
• Enabling the student to learn various topics in industrial engineering	**Objectives of the study subject**
21.Teaching and learning strategies	
1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**
22.Course structure	

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Discussion	Theoretical lecture	Introduction To Industrial Engineering	5%	2	1
Student Review Discussion and Feedback	Theoretical lecture	Benefit Study	5%	2	2
Tests	Theoretical lecture	Plant Layout	5%	2	3
Assignments	Theoretical lecture	Networks	5%	2	4
Reports	Theoretical lecture	Work And Time Study	7%	2	5
Tests		Linear Programming	8%	2	6
Student Review Discussion and Feedback	Theoretical lecture	Transportation Problems	8%	2	7
Midterm Exam	Theoretical lecture	Production Cost Control	8%	2	8
Review Feedback	Theoretical lecture	Depreciation	7%	2	9
Discussion	Theoretical lecture	Total Quality Management (TQM)	7%	2	10
Student Review Discussion and Feedback	Theoretical lecture	Quality Control	7%	2	11
Discussion and Reports	Theoretical lecture	Numerical Methods of Quality Control	7%	2	12
Self-Assessment	Theoretical lecture	Pareto Chart	7%	2	13
Tests		Exam	7%	2	14
Assessment	Theoretical lecture	Review	7%	2	15

23.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

24.Learning and teaching resources

• Enabling the student to learn various topics in industrial engineering	**Required textbooks (methodology, if any)**
Operation Research by Hamdy Taha	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Energy Management&Economics
Course description form

25.Course Name
Energy Management&Economics
26.Course Code
Em En Eei 405002 (2+0)
27.Semester/year
Second semester|2024-2025
28.Date this description was prepared
1-6-2023
29.Available attendance forms
Weekly
30.Number of study hours (total)/number of units (total)
45 hours
31.Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Ahmed Reyadh Radhi- Ph.D Email:
32.Course objectives

• Students learn the fundamentals of energy management and economics, including its characteristics and control mechanisms. This equips them with the necessary scientific and practical skills in energy management and economics methods, techniques, and the latest technologies, enabling them to perform their engineering work in laboratories, power plants,	**Objectives of the study subject**

energy generation and processing facilities, and the public sector.	

33.Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

34.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Feedback	Theoretical lecture	principles.	5%	2	1
Feedback	Theoretical lecture	Energy audit and distribution economic management.	5%	2	2
Feedback	Theoretical lecture	Energy conservation opportunities.	5%	2	3
Exam	Theoretical lecture	Engineering project, project life cycle, reasons for project failure	7%	2	4
Assignment	Theoretical lecture	Financial management	8%	2	5
Feedback		Monitoring and controlling costs	8%	2	6
Feedback	Theoretical lecture	Profit & contribution margin	8%	2	7
Feedback	Theoretical lecture	engineering economic measures and principles	7%	2	8
Assignment	Theoretical lecture	Key economic factors	7%	2	9
Midterm Exam	Theoretical lecture	Midterm Exam	7%	2	10
Feedback	Theoretical lecture	The network analysis	7%	2	11

Test	Theoretical lecture	Linear programming	7%	2	12
Feedback	Theoretical lecture	Organization structure	7%	2	13
Feedback		ISO 50001	7%	2	14
Feedback	Theoretical lecture	HR management	5%	2	15

35.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

36.Learning and teaching resources

* Kanoğlu, M., & Çengel, Y. A. (2020). Energy efficiency and management for engineers. McGraw-Hill Education. * Capehart, B. L., Turner, W. C., & Kennedy, W. J. (2020). Guide to energy management. River Publishers. • * Oung, K. (2016). Energy management in business: the manager's guide to maximising and sustaining energy reduction. Routled	**Required textbooks (methodology, if any)**
* Doty, S., & Turner, W. C. (2004). Energy management handbook. Crc Press. * Operation Research, Hamdy Ta.	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Instrumentation in Energy Systems
Course description form

1. Course Name
Instrumentation in Energy Systems
2. Course Code
Em En Iei 404901 (2+2)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared

23-5-2023

5. Available attendance forms

Weekly

6. Number of study hours (total)/number of units (total)

45hour

7. Name of the course administrator (if more than one name is mentioned)

Name: Lecturer Ahmed Walid Hussein - Ph.D Email:

8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	**Objectives of the study subject**

9. Teaching and learning strategies

1-Method of giving lectures. 2- Strategy Critical thinking in learning 3- Strategy High thinking 4- Strategy Brainstorming	**The strategy**

5- Student groups 6- Workshops 7- Scientific trips to follow up on the practical reality of the nature of the work of energy control systems 8-E-learning on campus 9-Experiential learning	

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Feedback	Lectures	Characteristics of measuring devices: Classifications of measuring devices	5%	3	1
Quizzes and Tests	Lectures	Characteristics of static and kinetic measuring devices	5%	3	2
Feedback and Formative Assessment	Lectures	Experimental error analysis - systematic and random	5%	3	3
Feedback and Formative Assessment	Lectures & discussions	Statistical analysis – inaccuracy	5%	3	4
Observations	Lectures & oral practicing	Experimental planning and selection of measuring instruments	7%	3	5
Self-assessment	Lectures & Active Learning	Reliability on devices	8%	3	6
Peer Assessment	Practicing Language	Unit Two: Measures of natural quantities: Thermometer - natural properties	8%	3	7
Examinations		Temperature measuring devices	8%	3	8
Peer Assessment	Lecture and test	Pressure and flow measuring devices	7%	3	9
Portfolios	Inquiry-Based Learning	Unit Three: -Advancing metrics techniques: tangent graphing	7%	3	10
Portfolios	Peer learning	Internal magnetic forces	7%	3	11
Assignments and Projects	Reflective Learning & Experimental Learning	Schileren	7%	3	12
Assignments and Projects	Reflective Learning & Experimental Learning	Accelerometer Laser Doppler	7%	3	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Hot wire speed meter	7%	3	14
Examinations		Standards Telemetry	7%	3	15

11.Course evaluation	
1-Exams 2-Continuous evaluation 3-Reports 4- Motivators 5-Feedback from students	
12.Learning and teaching resources	
Engineering Metrology, R. K. Jain, Khanna Publishers, 1994. Mechanical Measurements, Beckwith Marangoni and Lienhard, Pearson Education, 6th Ed., 2006.	**Required textbooks (methodology, if any)**
1. Engineering Metrology, IC Gupta, Dhapat Rai Publications, Delhi. 2. Mechanical Measurements, R. K. Jain 3. Industrial Instrumentation, Alsutko, Jerry. D. Faulk, Thompson Asia Pvt. Ltd.2002.	**Main references (sources)**
Mechanical Measurements, Beckwith Marangoni and Lienhard, Pearson Education, 6th Ed., 2006.	**Recommended supporting books and references (scientific journals, reports....)**
1- Control Systems Principles and Design, M. Gopal, Tata McGraw Hill Publishing Co. Ltd., New Delhi Copyright Year: 2020, dissidents. 2- https://archive.nptel.ac.in/courses/112/106/112106139/	**Electronic references, Internet sites**

Power Plants I
Course description form

1. Course Name
Power Plants I
2. Course Code
Em En Ppi 405305 (2+0)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared
1-6-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)

45 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Fouad Abdul Ameer Khalaf- Ph.D Email:
8. Course objectives

• A study of the different types of power plants. • A detailed study of thermal power plants. • A study of nuclear power plants.	Objectives of the study subject

9. Teaching and learning strategies	
1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Weekly exams - pre and post questions	Theoretical lecture	Introduction steam power plants	1	3	1
Weekly exams - pre and post questions	Theoretical lecture	Type of cycles	1	3	2
Weekly exams - pre and post questions	Theoretical lecture	Improving the efficiency of steam power plants	1&2	3	3
Weekly exams - pre and post questions	Theoretical lecture	Open feed water heater	1&2	3	4
Weekly exams - pre	Theoretical lecture	Close feed water heater	1&2	3	5

and post questions					
		Exam	1&2	3	6
Weekly exams - pre and post questions	Theoretical lecture	Regenerative cycles	1&2	3	7
Weekly exams - pre and post questions	Theoretical lecture	Condensers	1&2	3	8
Weekly exams - pre and post questions	Theoretical lecture	Boilers	1&2	3	9
Weekly exams - pre and post questions	Theoretical lecture	Method of improving boilers performance	1&2	3	10
	Theoretical lecture	Pumps	1&2	3	11
Weekly exams - pre and post questions	Theoretical lecture	Examples	1&2	3	12
Weekly exams - pre and post questions	Theoretical lecture	Valves	1&2	3	13
		Exam	1&2	3	14
Weekly exams - pre and post questions	Theoretical lecture	Review	2		15

11.Course evaluation

1. Tests and examinations
2. Discussion
3. Oral presentations and defense of reports or the proposed project
4. Feedback from students

12.Learning and teaching resources

• Principles of Combustion, by Mathewor Sharma	**Required textbooks (methodology, if any)**

• Principles of Thermodynamics, by Yunus • Power Plant Engineering, by P.K. Nag	
Internet sites	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Design of renewable energy systems I

Course description form

1. Course Name	
Design of renewable energy systems I	
2. Course Code	
Em En Dri 405204 (2+0)	
3. Semester/year	
First semester|2024-2025	
4. Date this description was prepared	
1-9-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
45hour	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Ali Muhammad Miqdad - Ph.D Email:	
8. Course objectives	
• Ability to establish a basis for the design and development of sustainable energy systems.	**Objectives of the study subject**

• Understand the construction, operation and use of concentrated solar panels and collectors. • Demonstrate a strong understanding of mathematical modeling of energy systems. • To learn about how a solar water system works and uses additional energy to increase performance. • Learn how to select and design an appropriate power system for an application. • Understand how a hybrid energy system can be applied to achieve multiple goals.	

9. Teaching and learning strategies

1. Lectures and discussion 2. Problem-based learning 3. Project-based learning (student groups) 4. Seminars, workshops and scientific visits 5. E-learning and blended learning 6. Reports	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
discussion	Lectures	Introduction to energy systems	1	3	1
Discussion and feedback from the student	Lectures	Design and operation of solar collectors	2	6	2-3
Tests	Lectures	Solar water heating system	3-4	9	4-6
Tests	Lectures	Auxiliary power system, piping system	5	6	7-8
Tests	Lectures	Temperature control and measurement	4	6	9-10
Discussion and feedback	Lectures	Energy storage system	5	6	11-12

from the student					
Discussion and reports	Lectures	Geothermal system, solar space heating system	6	6	13-14
Tests	Lectures	Review and project	6	3	15

11.Course evaluation	
1. Tests and examinations 2. Discussion 3. Oral presentations and defense of reports or the proposed project 4. Feedback from students	
12.Learning and teaching resources	
Salameh, Z. (2014). Renewable energy system design. Academic press.	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Nuclear engineering

Course description form

1. Course Name
Nuclear engineering
2. Course Code
Em En Nei 405507 (2+0)
3. Semester/year
First semester|2024-2025
4. Date this description was prepared

1-6-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
30 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Muhannad Jaber Yasser – Master's dregree Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.	**Objectives of the study subject**

• Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies

1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Atomic and nuclear physics	1	2	1
Quizzes and Tests	Lectures	Mass and energy	1	2	2
Feedback and Formative Assessment	Lectures	Binding energy	1	2	3
Feedback and Formative Assessment	Lectures &Active Learning	Interaction of radiation with matter	3	2	4
Observations	Lectures &Active Learning	Neutron attenuation	3	2	5
Self-Assessment	Lectures &Active Learning	Problem set_1	3	2	6
Peer Assessment	Flipped Classroom	Neutron diffusion and moderation	3	2	7
Examinations	Flipped Classroom	The equation of continuity	4	2	8
Peer Assessment	Flipped Classroom	Diffusion length	4	2	9
Portfolios	Inquiry-Based Learning	Problem set_2	4	2	10
Portfolios	Peer Learning	Nuclear reactor theory	4	2	11
Assignments and Projects	Reflective Learning &	Reactor geometries	6	2	12

	Experimental Learning				
Assignments and Projects	Reflective Learning & Experimental Learning	One-group critical equation	6	2	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Thermal reactors	6	2	14
Examinations		Final Examination	6	2	

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition. Nuclear Engineering Handbook, Frank Kreith & Roop Mahajan - Series Editors.	**Required textbooks (methodology, if any)**
Introduction to Nuclear Engineering John R. Lamarsh Anthony J. Baratta Third Edition.	**Main references (sources)**
Introduction to Nuclear Engineering - UNSW Handbook	**Recommended supporting books and references (scientific journals, reports....)**
https://www.amazon.com/Introduction-Nuclear-Engineering-John-Lamarsh/dp/0201824981	**Electronic references, Internet sites**

1. Course Name
Energy and environment
2. Course Code
Em En Eii 405810 (2+2)
3. Semester/year
Second semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
weekly
6. Number of study hours (total)/number of units (total)
30 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Muhannad Jaber Yasser – Master's dregree Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001). • Active contribution to the development of the engineering management system and scientific capabilities in the field of design,	**Objectives of the study subject**

manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization. • Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly. • Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback. • Active contribution to community service activities.	

9. Teaching and learning strategies

1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	Introduction to environmental pollution	1	2	1
Quizzes and Tests	Lectures	Material balance and energy fundamentals	1	2	2
Quizzes and Tests	Lectures	Classification of pollution	2	2	3
Quizzes and Tests	Lectures	Air pollution and control methods	3	2	4
Quizzes and Tests	Lectures	Sources and effects of air pollutants	3	2	5
Quizzes and Tests	Lectures	Sampling measurement and analysis of air pollutants	3	2	6

Quizzes and Tests	Lectures	Solid waste management: sources and classification	3	2	7
Examinations	Lectures	Solid waste disposal options	4	2	8
Quizzes and Tests	Lectures	Toxic waste management	4	2	9
Quizzes and Tests	Lectures	Water pollution: sources of water pollutants	4	2	10
Quizzes and Tests	Lectures	Classification and effects of water pollutants	4	2	11
Quizzes and Tests	Lectures	Water pollution laws and standards	6	2	12
Quizzes and Tests	Lectures	Environment for comfortable living and working	6	2	13
Quizzes and Tests	Lectures	Natural and artificial lightning	6	2	14
Examinations	Lectures	Noise pollution	6	2	15

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Gilbert M. Masters, Introduction to Environmental Engineering and Science, Third edition, 2014	**Required textbooks (methodology, if any)**
Lee CC, Environmental Engineering Dictionary, Fourth Edition, 2005	**Main references (sources)**
Lawrence, K. Wang, Handbook of Environmental Engineering, 2004	**Recommended supporting books and references (scientific journals, reports....)**
https://sciencedirect.com	**Electronic references, Internet sites**

Design of renewable energy systems II

Course description form

1. Course Name
Design of Renewable Energy Systems II
2. Course Code
Em In Drii 406012 (2+0)
3. Semester/year
Second semester|2024-2025
4. Date this description was prepared
4-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
45hour
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Ali Muhammad Miqdad - Ph.D Email:
8. Course objectives

• Teaching and training students to obtain a bachelor's degree in engineering sciences in energy engineering. • Preparing competent engineers in the field of energy engineering who meet the requirements for graduate outcomes included in the local specialized standards (national standards for engineering accreditation) and international standards (standards ABET) as well as the requirements of stakeholders. • Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and good educational laboratory standards (GLP) and national standards for laboratories and knowledge and awareness of professional specifications standards (Occupational Safety and Health	**Objectives of the study subject**

Management System ISO 45001, Environmental Management System ISO 14001, and Energy Management System ISO 50001).

- Active contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing, and quality control through the production of scientific research and graduation projects in the department's field of specialization.
- Participating in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the necessity of continuing self-development of professional knowledge and how to find, evaluate, compile, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Active contribution to community service activities.

9. Teaching and learning strategies

	The strategy
1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	

10.Course structure

Evaluation method	**Learning method**	**Name of the unit or topic**	**Learning Outcomes required**	**hours**	**the week**
Quizzes and Tests	Lectures	Thermal modeling	1	3	1
Quizzes and Tests	Lectures	Thermal modeling	2	3	2
Feedback and Formative Assessment	Lectures	Solar space heating system	1.2	3	3
Feedback and Formative Assessment	Lectures & Active Learning	Solar space heating system	3,4	3	4

Observations	Lectures & Active Learning	Solar space heating system	3.4	3	5
Self-assessment	Lectures & Active Learning	Solar distillation system	1.5	3	6
Peer Assessment	Flipped Classroom	Solar distillation system	1.5	3	7
Examinations	Flipped Classroom	PV solar cell	3	3	8
Peer Assessment	Flipped Classroom	PV solar cell	3	3	9
Portfolios	Inquiry-Based Learning	PV system	4	3	10
Portfolios	Lectures & Active Learning	PV system	4	3	11
Assignments and Projects	Lectures & Active Learning	Battery thermal management systems	5	3	12
Assignments and Projects	Lectures & Active Learning	Battery thermal management systems	5	3	13
Rubrics and Criteria-Based Assessments	Lectures & Active Learning	Solar dryer system	6	3	14
Assignments and Projects	Lectures & Active Learning	Revision and project	7	3	15

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

Salameh, Z. (2014). Renewable energy system design. Academic press.	**Required textbooks (methodology, if any)**
Handouts from different references	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Wind energy engineering

Course description form

1. Course Name
Wind energy engineering
2. Course Code
Em En Weii 406214 (1+2)
3. Semester/year
Second semester|2024-2025
4. Date this description was prepared
4-9-2023
5. Available attendance forms
weekly
6. Number of study hours (total)/number of units (total)
30 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Lecturer Fouad Abdel Amir Khalaf - Ph.D Email:
8. Course objectives

• Study of wind energy. • Study of the main types of wind turbines. • Study of wind farms and wind turbine design. • Study of aerodynamics.	**Objectives of the study subject**

9. Teaching and learning strategies	
1. Lectures and seminars 2. Problem-based learning (PBL) 3. Project-based learning (PrBL) 4. Workshops and practical exercises 5. Cooperative training and job training 6. E-learning and blended learning 7. Assessment for learning 8. Experiential learning/experiential learning	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and Tests	Lectures	ntroduction to wind energy	1	2	1

Quizzes and Tests	Lectures	Introduction to wind turbine	2	2	2
Feedback and Formative Assessment	Lectures	Classification of wind turbine .	2	2	3
Feedback and Formative Assessment	Lectures & Active Learning	Wind turbine control system	3	2	4
Observations	Lectures & Active Learning	Wind farm type	3	2	5
Self-assessment	Lectures & Active Learning	Wind power station type	4	2	6
Peer Assessment	Flipped Classroom	Wind energy conservation system	4	2	7
Examinations	Flipped Classroom	Horizontal and vertical wind turbine	4	2	8
Peer Assessment	Flipped Classroom	Wind turbine components	4	2	9
Portfolios	Inquiry-Based Learning	Wind turbine propeller design	5	2	10
Portfolios	Lectures & Active Learning	Velocity diagram	5	2	11
Assignments and Projects	Lectures & Active Learning	Aerodynamics, boundary layer, Airfoil	5	2	12
Assignments and Projects	Lectures & Active Learning	Aerodynamics, boundary layer, Airfoil	5.6	2	13
Rubrics and Criteria-Based Assessments	Lectures & Active Learning	ntroduction to wind energy	6	2	14
Assignments and Projects	Lectures & Active Learning	Exame	7	2	15

11.Course evaluation

1. Continuous calendar
2. Exams
3. Practical evaluations
4. Project evaluation
5. Oral presentations and defense
6. Peer evaluation
7. Self-evaluation and reflective journaling
8. External quality assurance

12.Learning and teaching resources

• Principles of Wind Turbines, by Mathur Sharma	**Required textbooks (methodology, if any)**

Wind Power Design, by Thomas Corke	
Websites	**Main references (sources)**
	Recommended supporting books and references (scientific journals, reports....)
	Electronic references, Internet sites

Energy system modeling and simulation

Course description form

1. Course Name	
Energy system modeling and simulation	
2. Course Code	
Em En Msii 406315 (2+0)	
3. Semester/year	
Second semester|2024-2025	
4. Date this description was prepared	
1-6-2023	
5. Available attendance forms	
Weekly	
6. Number of study hours (total)/number of units (total)	
45 hours	
7. Name of the course administrator (if more than one name is mentioned)	
Name: Lecturer Sabah Odeh Abdel Amir- Ph.D Email:	
8. Course objectives	
• Teaching and training students to obtain a Bachelor of Engineering Science degree in Energy Engineering. • Preparing qualified engineers in the field of energy engineering who meet the requirements for graduate outcomes included in specialized local standards (National Standards for Engineering Accreditation) and international	**Objectives of the study subject**

standards (Standards for Engineering Accreditation).ABET) as well as stakeholder requirements.

- Applying educational quality standards in preparing curricula and other requirements of the educational process through applying national standards for engineering accreditation, specialized international standards, and educational laboratory quality standards (GLP) and national laboratory standards and knowledge and awareness of professional standards (Occupational Safety and Health Management System ISO 45001, Environmental Management System ISO 14001 and Energy Management System ISO 50001).
- Effective contribution to the development of the engineering management system and scientific capabilities in the field of design, manufacturing and quality control through the production of scientific research and graduation projects in the department's field of specialization.
- Participation in spreading engineering awareness, holding scientific courses, field visits to manufacturing laboratories, and the ability to recognize the need to continue self-development of professional knowledge and how to find, evaluate, collect, and apply it correctly.
- Continuous improvement in all aspects of the department's educational program is achieved by applying the principle of self-evaluation and benefiting from feedback.
- Effective contribution to community service activities.

9. Teaching and learning strategies

The strategy
1.Lectures:Traditional classroom lectures can provide a structured introduction to basic concepts, theories, and methodologies. Lectures can be supplemented with multimedia presentations, info graphics and real-world examples to enhance understanding. 2. Studies the condition: Analyzing case studies of real energy systems can help students apply theoretical knowledge to practical scenarios. Discussing the challenges encountered and solutions implemented in these cases can deepen understanding. 3. Workshops the operation: Organizing practical workshops where students can work with simulation software (example, MATLAB and Pythonand specialized energy simulation tools) to create models and analyze energy systems. 4. Speakers Guests: Invite guest speakers from the energy industry or academia to share their expertise and real-world experiences. This can provide students with insight into industry practices and current trends.

5. Discussions the group: Engage students in group discussions to explore topics in more depth. Encourage them to analyze energy systems more closely monetary, and discuss the positives and the negatives, and suggest solutions. 6. Offers Interactivity :Use demonstrations or interactive experiments to demonstrate the principles of a system energy, Such as how different energy sources work or the behavior of energy storage systems. 7. Solution sessions the problems: Conduct sessions where students work through complex energy system problems as a group or individually. This encourages critical thinking and application of concepts. 8. Resources via Internet: Use online resources such as videos, podcasts, and interactive simulations to supplement traditional teaching methods. Online resources can cater to different learning styles. 1. Study Independent: Encourage students to read relevant textbooks, research papers, and articles. This promotes self-directed learning and deeper engagement with the subject matter. 2. Exercises practical: Assign simulation exercises and programming tasks to allow students to apply theoretical concepts practically. This builds skills in modeling and analysis. 3. Projects the group :Assign group projects where students collaborate to create comprehensive models of the energy system. This helps them develop teamwork skills and apply knowledge to real-world scenarios. 4. Learn from Peers: Organize peer review sessions where students provide feedback on each other's projects, models, or presentations. This encourages critical evaluation and communication skills. 5. Solution-based learning the problems: Presenting real-world energy challenges to students and guiding them to research, analyze, and propose solutions. This approach enhances problem-solving skills. 6.Offers:Assign students topics or case studies and have them present their findings to the class. This enhances communication skills and deepens understanding through peer learning. 7. Simulation Interactivity :Integrate interactive simulations and virtual laboratories to allow students to experiment with energy system models and observe their behavior. 8. Field trips and visits Field: If so possible, Organize visits to power generation facilities, storage sites or distribution centers. This provides a realistic context and promotes experiential learning.	Learning methods

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Quizzes and tests	Lectures	Unit 1: Introduction to energy systems and modeling • Overview of power systems and their components • Energy sources and their characteristics • The importance of modeling and simulation in energy analysis	1	2	1
Quizzes and tests	Lectures	Unit 2: Mathematical and computational tools • Differential equations and their role in energy system modeling • Numerical methods for solving differential equations • Introduction to optimization techniques in power systems • Programming languages and power system simulation tools	1	2	2

Feedback and formative assessment	Lectures	Unit 3: Modeling of power generation technologies • Modeling renewable energy sources (energysolar,energywind,energyaquatic,etc) • Modeling conventional energy sources (fossil and nuclear fuels) • Case studies of power generation technologies	1	2	3
Feedback and formative assessment	Lectures and active learning	Unit 4: Modeling energy conversion and storage • Thermodynamic modeling of energy conversion processes • Modeling of energy storage systems (batteries,Storagethermal,etc) • Dynamic behavior and transient analysis of energy storage systems	3	2	4
Notes	Lectures and active learning	Unit 5: Energy Distribution and Integration • Modeling of energy transmission and distribution systems • Integration of multiple energy sources and technologies • Control strategies for efficient power system operation	3	2	5
self-evaluation	Lectures and active learning	Unit 6: Environmental and Economic Analysis • Energy systems life cycle assessment (LCA) • Economic modeling and cost analysis • Sustainability considerations and environmental impact assessment	3	2	6
Peer evaluation	Flipped classroom	Unit 7: Dynamic Simulation and Transient Analysis • Dynamic simulation of energy systems • Transient analysis of system behavior • Case studies of system response to changing conditions	3	2	7
Tests	Flipped classroom	Unit 8: Advanced Topics and Emerging Trends • Stochastic modeling and uncertainty analysis • Model validation and verification techniques • Multi-objective optimization in power system design • Emerging trends in energy modeling and simulation	4	2	8
Peer evaluation	Flipped classroom	Unit 9: Case studies and real-world applications • In-depth analysis of real power system case studies • Grid integration simulation for renewable energy sources • Energy system modeling for policy analysis and decision making	4	2	9
Governor	Inquiry-based learning	Unit 10: Student projects and practical exercises • Practical simulation exercises using relevant software	4	2	10

		• Small-scale energy system modeling projects with real-world relevance • Presentation and discussion of student projects			
Governor	Peer learning	Unit 11: Communication and presentation skills • Effective communication of simulation results and results • Presentation skills to convey complex technical information	4	2	11
Tasks and projects	Reflective learning and experiential learning	Unit 12: Review and final evaluation • Review the main concepts and methodologies covered in the course • Preparing for the final assessment (presentations the project, exams ,etc.)	6	2	12
Tasks and projects	Reflective learning and experiential learning	• Assignments and quizzes throughout the course (20%) • Practical exercises and simulation tasks (15%) • Midterm exam (20%) • Group projects and presentations (25%) • Class participation and communication skills (10%) • Final project and presentation (10%)	6	2	13
Tests		final exam	6	2	

11. Course evaluation

Assessment methods are essential to assess students' understanding, skills and progress in a course. For a course on "Modeling and Simulation of Energy Systems" ,a combination of assessment methods can provide a comprehensive view of students' abilities. Here are some evaluation methods that can be used:

1. Duties and tests:
- Regular assignments and tests can assess students' understanding of theoretical concepts and mathematical foundations.
- Assigning programming tasks related to energy system modeling to evaluate practical skills.
- Quizzes can be used to test specific topics covered in lectures or readings.

2. practical exercises :
- Assign simulation exercises where students create energy system models and analyze their behavior using simulation software.
- Evaluating the accuracy of its models, the suitability of its simulations, and its ability to explain the results.

3.Tests:
- The midterm and/or final examination can evaluate students' understanding of the basic concepts, theories and principles covered in the course.
- Design questions that require critical thinking and problem-solving skills rather than just memorization.

4. Projects the group:
Assign group projects where students work together to develop comprehensive energy system models based on real-world scenarios.
- Evaluate their ability to integrate components different, and improve performance the system, and present their findings.

5.Offers:
- Have students present their simulation results, project results, or case study analyzes to the class.
- Evaluation of communication skills they have ,the ability to explain concepts complex, and their ability to present data effectively.

6. class participation
- Evaluate student participation in class discussions, workshops, and peer review sessions.
Active participation can demonstrate their understanding and willingness to engage with the topic.

7. The project final:
- Design a comprehensive final project that requires students to apply their knowledge of energy system modeling to solve a complex problem.
- Assess their ability to create accurate models, analyze scenarios, and provide meaningful results.

8. review Peers:
- Incorporating peer evaluation into projects collective, students provide feedback on each other's work.
- This can encourage critical evaluation and enhance collaboration and communication skills.

9. Written Reports :
- Asking students to submit written reports on assignments, projects, or simulations.
- Assess their ability to convey their analyses, results, and conclusions clearly and accurately.

10. Tests or discussions via Internet:
- Use online platforms to conduct tests or discussions to facilitate continuous assessment.
- These platforms can provide immediate feedback and encourage ongoing engagement.

11. Exams the operation:
- Conduct practical tests where students demonstrate their ability to create and run simulations in real time.
- Evaluate their proficiency in using simulation programs and applying modeling techniques.

12.Learning and teaching resources

Required textbooks (methodology, if any)	
1.."Introduction to Modeling and Analysis of Complex Systems" by Hiroki Sayama. This book provides a general introduction to systems modeling complex, including systems energy, it covers different modeling techniques and approaches. 2.."Energy Systems Engineering: Evaluation and Implementation" by Francis Vanek, Louis Albright, and Largus Engineer. - Provides a comprehensive overview of the systems energy, Including modeling, analysis and implementation. It covers both conventional and renewable energy sources. 3.."Energy Systems Analysis and Management" by Francis Vanek and Louis Albright. - Focuses on systems analysis and management energy, it covers modeling energy, and improvement ,and sustainability aspects. 4.."Modeling and Simulation of Dynamical Systems" by Robert L. Woods and Kent L. Lawrence. - This textbook provides a solid foundation in dynamic system modeling and techniques simulation, Which is highly applicable to power system analysis. 5.."Renewable Energy Systems: A Smart Energy Systems Approach to Selecting and Modeling 100% Renewable Solutions" by Henrik Lund. - Covers modeling and analysis of renewable energy systems and their integration into the energy mix. 6.."Energy Systems: A New Approach to Thermodynamic Engineering" by Peter W. Bridgman. - Provides an engineering perspective on energy systems, thermodynamics and conversion processes energy, which provides a strong basis for modeling. 7.."Energy Conversion" by Dr. Yogi Goswami and Frank Krith. - Focuses on conversion principles energy ,including modeling and simulation of various energy conversion technologies.	

8.."Introduction to Energy and the Environment" by Vincenzo Bianco and Paolo Ciano. - Covers the basics of energy systems, energy sources and their environmental impact. It includes modeling aspects related to sustainability. 9.."Energy Economics: Concepts, Issues, Markets and Governance" by Subhes C. Bhattacharyya. While this book focuses primarily on...Economy, Explores energy system modeling in the context of economic analysis. 10.."Applied Energy: An Introduction" by Muhammad Omar Abdullah. - Provides an introduction to various energy sources, conversion technologies, and modeling techniques for energy systems.	
"Energy Systems and Sustainability: Energy for a Sustainable Future" by Bob Everett, Godfrey Boyle and Stephen Beck This reference covers various aspects of energy systems, sustainability and modeling approaches.	**Main references (sources)**
"Applied Mathematical Methods for Engineers" by Louis A. Pipes and Lawrence R. Harvill An in-depth resource for mathematical methods and techniques commonly used in energy system modeling.	**Recommended supporting books and references (scientific journals, reports....)**
1.. International Energy Agency (IEA). - [Website] (https://www.iea.org/) The IEA provides a wealth of data, reports and analyzes related to energy systems, including renewable energy, energy efficiency and energy technology roadmaps. 2. US Energy Information Administration (EIA). - [Website] (https://www.eia.gov/) The EIA provides comprehensive data on energy production, consumption and trends, as well as analyzes and reports on energy markets and policies. 3..National Renewable Energy Laboratory (NREL). - [Website] (https://www.nrel.gov/) The NREL website offers a range of resources on energy technologies renewable, including research papers, reports and simulation tools. 4..European Commission Joint Research Center (JRC). - [Website] (https://ec.europa.eu/jrc/en) - The JRC provides research, data and modeling tools related to energy and environmental issues within the European Union. 5..Energy Information Exchange (EiX). - [Website] (https://energyinformatics.eu/) EiX is a platform that provides energy-related datasets, tools and resources for energy research and education. 6..Energy Plus. - [Website] (https://energyplus.net/) Energy Plus is a building energy simulation software that can be used to model and analyze the energy consumption and thermal performance of buildings. 7..Homer Energy. - [Website] (https://www.homerenergy.com/) HOMER is software to improve small and distributed energy system design and decision making.	**Electronic references, Internet sites**

8..System Advisor Model (SAM). - [Website] (https://sam.nrel.gov/) SAM is a performance and financial model designed to facilitate decision making for renewable energy projects. 9..PLEXOS® integrated energy model. - [Website] (https://www.energyexemplar.com/plexos/) PLEXOS is a software widely used for market simulation and analysis energy, including the integration of different energy sources. 10..MIT Open Course Ware (OCW) - Energy Cycles. - [Website] (https://ocw.mit.edu/index.htm) - MIT OCW provides free access to course materials from various related courses with energy ,including lectures, assignments and readings. 11..Power Courses Coursera and EDX. - [Coursera] (https://www.coursera.org/) | [edX] (https://www.edx.org/) - Offering online platforms such as Coursera AndedXA group of related training courses with energy, some of which provide free access to course materials. 12..The world of renewable energy. - [Website] (https://www.renewableenergyworld.com/) - This site provides news, articles and insights related to renewable energy technologies, policies and trends.	

English Language

Course description form

1. Course Name
English
2. Course Code
Em En EIV 101616 (2+0)
3. Semester/year
Second semester|2024-2025
4. Date this description was prepared
1-9-2023
5. Available attendance forms
Weekly
6. Number of study hours (total)/number of units (total)
30 hours
7. Name of the course administrator (if more than one name is mentioned)
Name: Assistant professor Rusul Dawood Salman – Master's degree Email:

8. Course objectives

• Developing reading, writing, speaking and listening language skills English. • Presentation theoretical study comprehensive information about how the student learns and develops his skills. • Providing an overview of various important issues related to the English language that helps the student communicate easily with others. • Application of theoretical aspects and that by allowing the student to practice the language and encouraging him to speak with foreigners. • • Giving students the ability to express their opinions and participate in discussions • Using digital means and tools to contribute to the formation and interpretation of meanings required.	**Objectives of the study subject**

9. Teaching and learning strategies

1. Lectures and seminars 2. Audio recording method 3. Assessment for learning 4. Learn the language of the community 5. Communicative language teaching	**The strategy**

10.Course structure

Evaluation method	Learning method	Name of the unit or topic	Learning Outcomes required	hours	the week
Feedback	Lectures	Introduction – Giving general information about the English Language	1	2	1
Quizzes and Tests	Lectures	Speaking (paired choice) asking about the general opinions	1	2	2

		about possible issues			
Feedback and Formative Assessment	Lectures	Speaking (campus announcement & general conversation) report on the speaker's opinion & explain why he/she feels that way	1	2	3
Feedback and Formative Assessment	Lectures & discussions	Integrated speaking (Academic reading & Lecture) explaining the academic topics & describing the main points in it.	3	2	4
Observations	Lectures & oral practices	Listening to engineering conversations to obtain a wide vocabulary	3	2	5
Self-assessment	Lectures & Active Learning	Listening to various videos concerning the engineering fields such as: (Mechanical engineering, electrical engineering in addition to renewable energies).	3	2	6
Peer Assessment	Practicing Language	Mid-term Exam	3	2	7
Examinations		Writing (learning students how to write essays on the engineering field)	4	2	8
Peer Assessment	Lecture and test	Writing (enabling students to write their opinion about specific academic topics in general or write about engineering subjects in particular).	4	2	9
Portfolios	Inquiry-Based Learning	Speaking (making the students sum up the main points of the lecture that is previously delivered)	4	2	10

Portfolios	Peer learning	Speaking (increasing the student's ability to speak fluency and increasing its rate)	4	2	11
Assignments and Projects	Reflective Learning & Experimental Learning	Listening (encourage the student to make inferences from what he/she heard before)	6	2	12
Assignments and Projects	Reflective Learning & Experimental Learning	Listening (ask the student what the speaker implies in his/her speech)	6	2	13
Rubrics and Criteria-Based Assessments	Reflective Learning & Experimental Learning	Writing (ask the student to write the essential information in the highlighted sentences in a paragraph and make paraphrasing in to those sentences)	6	2	14
Examinations		Final Examination	6	2	15

11.Course evaluation

12.Learning and teaching resources

New Headway Plus The author: John & Liz Soars TOEFL Practice Online The official practice test that can help you go anywhere	**Required textbooks (methodology, if any)**
The Cambridge Encyclopedia of the English Language by David Crystal	**Main references (sources)**
Ciedupress.com/journal/index. Php / wjel	**Recommended supporting books and references (scientific journals, reports....)**
https://www.cambridge.org./	**Electronic references, Internet sites**