وازرة التعليم العالي والبحث العلمي جـــهاز

الإشـــراف والتقـــويم العلـمي

دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الاكاديمي للعام الدراسي ٢٠٢٤_٢٠٢٥ للكليات والمعاهد

الجامعة : جامعة شط العرب الاهلية

الكلية /المعهد : الكلية التقنية الهندسية

القسم العلمي : قسم هندسة تقنيات الأجهزة الطبية

تاريخ ملء الملف : 2025/8/4

التوقيع :

اسم رئيس القسم : د. هناء نبيل حسين

التاريخ : 2025/8/4

التوقيع :

اسم المعاون العلمي: أ.د. كامل حسين السوداني

التاريخ : 4/8/2025

الاستاذ الدكتور
كامل حسين السوداني
كيمياء تحليلية

الكلية التقنية الهندسية
اللجنة الامتحانية
هندسة تقنيات الاجهزة الطبية

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: التاريخ

/ /

التوقيع

مصادقة السيد العميد

أ.م.د. مازن عبدالاله علوان

عميد الكلية التقنية الهندسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Mathematics			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2104				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		MIET	**College**	EETC	
Module Leader	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Saleem Lateef Mohammed	**e-mail**	Saleem_lateef_mohammed@mtu.edu.iq	
Scientific Committee Approval Date		8/11/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Integral Mathematics-MIET1204	**Semester**	UGI-S2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The goal of this module is to give students the necessary mathematical skills and tools to solve a range of design engineering issues. 2. Demonstrate basic knowledge and understanding of a core of vector analysis, linear algebra and applied mathematics. 3. Introduce student to Infinite and power series. 4. Understand how to solve Differential equations of the 1st and nth order. 5. Introduce student to Integral Transforms: Fourier series and Laplace transform and their applications in signal and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define a vector, represent a vector by a directed straight line, add vectors, write a vector in terms of component vectors, write a vector in terms of component unit vectors, set up a coordinate system for representing vectors, and obtain the direction of a vector. 2. Explain the concept of a vector field and make sketches of simple vector fields in the plane 3. Memorize algebraic definitions and explain geometric meanings of dot and cross products 4. Compute dot and cross products given either algebraic or geometric information. 5. Apply dot or cross product to determine angles between vectors, scalar and vector projections, and volumes of parallelipipeds. 6. Memorize change of coordinate formulae between rectangular and cylindrical coordinate systems. 7. Memorize change of coordinate formulae between rectangular and spherical coordinate systems. 8. Identify coordinate surfaces in cylindrical and spherical coordinate systems as well as Converting equations between rectangular, cylindrical and spherical coordinate systems. 9. know what is meant by infinite series & its convergence, 10. Learn formation of Differential Equations - solutions of first order Differential Equations: Homogeneous-Non-homogeneous - Exact – Non-exact and solutions of nth order Differential Equations as well. 11. Definition of Laplace and Fourier transforms, Condition for existence, Laplace

	transform of standard functions, Properties of Laplace transform, 12. Application of Laplace and Fourier transforms to ordinary differential equations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Vector analysis,Vector fields,Orthogonal vectors and Dot Product, Parallel vectors and Cross Product, in addition to Partial Derivatives: Formulas for Del operation. [25 hrs] Polar Coordinates,Cylindrical Coordinates Systems, Spherical Coordinates Systems, and Infinite series.Power series. [23 hrs] Convergence and divergence series, Differential equation of the first order, Differential equation of *nth* order.Integral Transforms: Fourier series and Laplace transform.[25 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**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	5% (10)	4 and 10	LO #1- #4 and #5 - #9
	Online assignments	2	5% (10)	3 and 6	LO #1- #4 and #5 - #8
	Report	1	10% (10)	14	LO #1- #6 and #7 - #12
	OnSite assignment	2	5% (10)	5 and 14	LO #1- #5 and #6- #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #8
	Final Exam	3hr	50% (50)	16	LO #1- #12
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Vector analysis.
Week 2	Vector fields.
Week 3	Orthogonal vectors and Dot Product.
Week 4	Parallel vectors and Cross Product.
Week 5	Partial Derivatives: Formulas for Del operation.
Week 6	Polar Coordinates.
Week 7	**Mid-term Exam** + Cylindrical Coordinates Systems.
Week 8	Spherical Coordinates Systems.
Week 9	Infinite series.
Week 10	Power series.
Week 11	Convergence and divergence series.
Week 12	Differential equations.
Week 13	Differential equation of the first order.
Week 14	Differential equation of *nth* order.
Week 15	Integral Transforms: Fourier series and Laplace transform.
Week 16	**Preparatory week before the final Exam.**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	https://dokumen.tips/download/link/engineering-mathematics-5th-ed-by-k-a-stroud.html (**pdf**)	No
Recommended Texts	https://www.bau.edu.jo/UserPortal/UserProfile/PostsAttach/59003_3812_1.pdf	No
Websites	https://dokumen.tips/download/link/engineering-mathematics-5th-ed-by-k-a-stroud.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.