

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Analysis		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CET3204			
ECTS Credits	5			
SWL (hr/sem)	150			
Module Level	3	Semester of Delivery		6
Administering Department	CET	College	EETC	
Module Leader	Oras Ahmed Shareef		e-mail	dr.oras@mtu.edu.iq
Module Leader's Acad. Title	Assist. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Prof. Dr. Mahmood Farhan Mosleh		e-mail	drmahmood@mtu.edu.iq
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Scientific Committee Approval Date	13/06/2023		Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics II (CET1204)	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims to provide students with a fundamental understanding of basic and advanced engineering analysis techniques, including engineering components and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduce the students to the theory and application of Laplace transform. 2. Give students an understanding of the time and frequency domain with different functions. 3. Get better in powered circuit analysis with applications and practical examples of matrix in Matlab. 4. Introduce the z-transform, which is the generalisation of the Laplace transform to discrete-time systems. 5. Provide students with a fundamental understanding of basic and advanced statistical techniques. 6. Provide students with a fundamental understanding of statistical measurements and graphs. 7. Provide an introduction to the method, tools and ideas of numerical computation, including the bisection method, false position method, and Newton-Raphson method. 8. Use numerical methods for solving algebraic and transcendental equations and solutions of linear and non-linear simultaneous equations. 9. Understand the basic theory of the numerical solution of ordinary differential equations. 10. Be familiar with the theorem that is related to matrices and its applications to analysis of the electronic circuits. 11. Learning the method of solving complicated equations. 12. Applying all of the above outcomes practically using Matlab.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Laplace Transform [15 hrs] - Z-transform [15 hrs] - Numerical computations [15hrs] - solution of linear simultaneous [10hrs] - Solution of nonlinear equation [5 hrs] - Numerical solution of ordinary differential equation [5 hrs] - High-level assessment Matrix [5 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 the type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.4
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, 10	LO #1-3 , LO # 4-10
	Assignments	2	10% (10)	2, 12	LO # 1-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-11
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental of Laplace transform (L.T)
Week 2	properties, theorem of L.T
Week 3	Applications of L.T in electronic circuits
Week 4	Fundamental of Z-transform (Z.T)
Week 5	properties, theorem of Z.T
Week 6	Applications of Z.T
Week 7	Mid-term exam
Week 8	Numerical computations
Week 9	(bisection method, false position method,
Week 10	Newton Raphson's method, solution of algebraic and transcendental equations
Week 11	solution of linear simultaneous equations : 1)Direct methods: a)Gauss elimination B)Gauss Jordan
Week 12	2)Iterative method a)Jacobi's B)Gauss seidel iteration)
Week 13	Solution of nonlinear equation (Newton Raphson method)
Week 14	Numerical solution of ordinary differential equation (Picard's, Euler's method)
Week 15	Matrices solution of the linear system of equations, linear transformations, Cayley-Hamilton theorem
Week 16	The preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Using Matlab in engineering analysis
Week 2	Lab 2: application of Laplace transform in electronic circuits.
Week 3	Lab 3: application of Z-transform
Week 4	Lab 4: bisection method
Week 5	Lab 5: newton-Raphson method
Week 6	Lab 6: Numerical solution of ordinary D.E
Week 7	Lab 7: Gaussian elimination and Gaussian Jordan methods

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Higher Engineering Mathematics by Dr. B.S. Grewal	Yes
Recommended Texts	An introduction to Numerical analysis by David F. Mayers	yes
Websites	www.ocw.mit.edu , www.math.uiowa.edu	

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 is required but credit awarded
	F – Fail	راسب	(0-44)	A 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.