

وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي ٢٠٢٣-٢٠٢٤

الجامعة : تكريت

الكلية/ المعهد: كلية هندسة العمليات النفطية

القسم العلمي : هندسة سيطرة المنظومات النفطية

تاريخ ملء الملف : ٢٠٢٣/١١/٢٥

التوقيع :

اسم المعاون العلمي : أ.م.د. عمر ياسين ضايح

التاريخ : ٢٠٢٣/١٢/٣

التوقيع :

اسم رئيس القسم : م. ياسين خضر ياسين

التاريخ : ٢٠٢٣/١١/٢٨

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: م.م. أيوب إبراهيم محمد

التاريخ : ٢٠٢٣/١١/٢٨

التوقيع :

مصادقة السيد العميد

أ.م.د. غسان حمد عبد الله

٢٠٢٣/١٢/٣

التوقيع :



Ministry of Higher Education and
Scientific Research - Iraq
University of Tikrit
College of Petroleum Process Engineering
Department of Petroleum System Control
Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	MATHEMATICS II		Module Delivery	
Module Type	BASIC		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	PCS123			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	Semester of Delivery		2
Administering Department	PCS	College	PPE	
Module Leader	Ali H. Mhmood		e-mail	ali.h.mhmood@tu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail	None
Peer Reviewer Name			e-mail	
Review Committee Approval			Version Number	1

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PCS113	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand and apply the concepts of volumes using cross-sections and cylindrical shells in the context of definite integrals.2. To explore and calculate arc length and areas of surfaces of revolution using definite integrals.3. To comprehend and utilize the properties and derivatives of inverse functions, natural logarithms, and the integrals of trigonometric functions such as $\tan x$, $\cot x$, $\sec x$, and $\csc x$.4. To learn logarithmic differentiation, study exponential functions, and understand the derivative and integral of exponential functions.5. To grasp the laws of exponents, comprehend the general exponential function, and apply L'Hôpital's rule to evaluate indeterminate forms.6. To become familiar with inverse trigonometric functions and hyperbolic functions.7. To master the technique of integration by parts and solve trigonometric integrals.8. To understand and apply trigonometric substitutions and the integration of rational functions by partial fractions.9. To analyze and solve improper integrals.10. To comprehend general first-order differential equations and their solutions.11. To study first-order linear equations and their applications.12. To understand the concept of sequences and explore infinite series.13. To calculate geometric series and apply the integral test to determine convergence or divergence of series.14. To utilize comparison tests, the ratio test, and the root test to determine the convergence or divergence of infinite sequences and series.
<p>Module Learning</p>	<ol style="list-style-type: none">1. Understand and apply volume calculations using cross-sections and

<p>Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>cylindrical shells.</p> <ol style="list-style-type: none"> 2. Calculate arc length and areas of surfaces of revolution using definite integrals. 3. Apply properties of inverse functions, natural logarithms, and trigonometric integrals to problem-solving. 4. Utilize logarithmic differentiation and evaluate derivatives and integrals of exponential functions. 5. Apply laws of exponents, L'Hôpital's rule, and evaluate indeterminate forms in calculus. 6. Demonstrate proficiency in inverse trigonometric functions and hyperbolic functions. 7. Apply integration by parts and solve trigonometric integrals effectively. 8. Utilize trigonometric substitutions and partial fraction decomposition for integration of rational functions. 9. Analyze and solve problems involving improper integrals. 10. Solve general first-order differential equations and interpret their solutions. 11. Solve first-order linear differential equations and apply them to real-life applications. 12. Understand the concept of sequences and demonstrate knowledge of infinite series. 13. Determine convergence or divergence of series using geometric series and the integral test. 14. Apply comparison tests, the ratio test, and the root test to evaluate convergence or divergence of infinite sequences and series.
<p>Indicative Contents المحتويات الإرشادية</p>	<ol style="list-style-type: none"> 1. Contents include the application of definite integrals, such as the calculation of volumes using cross-sections and cylindrical shells, and the determination of arc length and areas of surfaces of revolution. [4 hrs] 2. Transcendental functions are covered, including the derivatives of

	<p>inverse functions and natural logarithms, the integration of trigonometric functions such as $\tan x$, $\cot x$, $\sec x$, and $\csc x$, logarithmic differentiation, and the derivatives and integrals of exponential functions. The laws of exponents, the general exponential function, and indeterminate forms, along with L'Hôpital's rule, are also addressed. Inverse trigonometric functions and hyperbolic functions are explored. [8 hrs]</p> <p>3. Techniques of integration are discussed, encompassing topics such as integration by parts, trigonometric integrals, trigonometric substitutions, the integration of rational functions by partial fractions, and the analysis and solution of improper integrals. [6 hrs]</p> <p>4. The focus is on first-order differential equations, including the study of general first-order differential equations and their solutions, as well as the exploration of first-order linear equations and their applications. [4 hrs]</p> <p>5. Infinite sequences and series are examined, covering concepts such as sequences, infinite series, geometric series, the integral test, and comparison tests. The application of the ratio test and the root test to determine the convergence or divergence of infinite sequences and series is also discussed. [6 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The Learning and Teaching Strategies of the course on transcendental functions, techniques of integration, first-order differential equations, and infinite sequences and series employ a combination of active learning, problem-solving activities, and interactive discussions. The course aims to foster student engagement and critical thinking through a variety of instructional methods. These strategies include hands-on exercises, group work, real-world applications, and the use of technology such as graphing calculators and mathematical software. The instructors provide clear explanations, demonstrations, and examples to facilitate conceptual understanding and promote the application of mathematical principles. They encourage active participation and collaborative learning, fostering a supportive and inclusive learning environment. Assessments are used to gauge student progress and provide timely feedback, allowing for targeted interventions and adjustments in instruction. Overall, the course employs a learner-centered approach that emphasizes the development of mathematical reasoning skills, problem-solving abilities, and a deep understanding of the course content.</p>
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	4, 11	LO #1, 2, 3, 7, 8, 9, and 10
	Assignments	5	15% (15)	Continuous	
	Projects / Lab.	-	-	-	-
	Report	1	5% (5)	14	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO #1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Applications of Definite Integrals: Volumes Using Cross-Sections; Volumes Using Cylindrical Shells
Week 2	Applications of Definite Integrals: Arc Length, Areas of Surfaces of Revolution
Week 3	Transcendental Functions: Inverse Functions and Their Derivatives; Natural Logarithms; The Integrals of $\tan x$, $\cot x$, $\sec x$, and $\csc x$
Week 4	Transcendental Functions: Logarithmic Differentiation; Exponential Functions; The Derivative and Integral of the exponential functions
Week 5	Transcendental Functions: Laws of Exponents; The General Exponential Function; Indeterminate Forms and L'Hôpital's Rule
Week 6	Transcendental Functions: Inverse Trigonometric Functions; Hyperbolic Functions
Week 7	Techniques of Integration: Integration by Parts; Trigonometric Integrals
Week 8	Techniques of Integration: Trigonometric Substitutions, Integration of Rational Functions by Partial Fractions
Week 9	Techniques of Integration: Improper Integrals
Week 10	First-Order Differential Equations: General First-Order Differential Equations and Solutions
Week 11	First-Order Differential Equations: First-Order Linear Equations; Applications

Week 12	Infinite Sequences and Series: Sequences; Infinite Series
Week 13	Infinite Sequences and Series: Geometric Series; The Integral Test
Week 14	Infinite Sequences and Series: Comparison Tests, The Ratio and Root Tests
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas' calculus 11 ed. 2004	Yes
Recommended Texts	Solution Manual of Thomas' calculus 11 ed. 2004	No
Websites	https://cse.uotechnology.edu.iq/images/sj_univer/course%20specification/1/Mathametics%20II-Course%202-The%20First_year_compressed.pdf	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.