

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics/III		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PE 213		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	1st
Administering Department	PE	College	CE
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PE 114 and PE123		Semester
			First and Second
Co-requisites module			Semester

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	• Present new ways to define curves in the plane by using the Polar Coordinates rather than the rectangular or cartesian system. • Review the geometric definitions and standard equations of parabolas, ellipses, and hyperbolas. • Solve problems involving parametric equations and apply integration to parametric curves. • Develop the students' knowledge about the vectors in three-dimensional space and its components so that vectors provide simple ways to define equations for lines, planes, curves, and surfaces in space. • Develop the student knowledge about differentiation and integration by differentiating the function of several variables and integration with double and triple integral. • Understand and apply the concepts of vector fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the class, the student will be able to: 1. Learn to use the polar coordinates system. 2. Learn how to calculate areas under curves and lengths in polar form. 3. Understand and analyze the parametric equations. 4. Understand and apply vector operations to geometry, and compute dot and cross products. 5. Learn how to present the curves in space using vector-valued functions. 6. Apply differentiation and integrations to vectors. 7. Able to evaluate the double and triple integral. 8. Visualize and analyze vector fields. 9. Work in groups and function on multi-disciplinary teams. 10. Understand professional, social and ethical responsibilities. 11. Communicate effectively. 12. Students will have developed problem solving and reasoning abilities that will serve them well in many important petroleum engineering aspects as well as their lives.
Indicative Contents المحتويات الإرشادية	Parametric Equations and Polar Coordinates • Parametrizations of Plane Curves • Calculus with Parametric Curves • Parametric Equations and Polar Coordinates Polar Coordinates • Graphing Polar Coordinate Equations • Parametric Equations and Polar Coordinates • Graphs of Polar Coordinates • Areas and Lengths in Polar Coordinates • Conic Sections • Conics in Polar Coordinates • Change from Cartesian to polar coordinates Vectors and the Geometry of Space • Vectors • The Dot Product • Vectors and the Geometry of Space • Lines and Planes in Space • Cylinders and Quadric Surfaces Vectors in Two Space Vectors in Three Space • Vector-Valued Functions and Motion in Space • Curves in Space and Their Tangents • Integrals of Vector Functions; Projectile Motion • Vector Valued Functions • Arc Length in Space • Curvature and Normal Vectors of a Curve Differentiation and integration of vectors • Line Integrals • Vector Fields and Line Integrals: Work, Circulation, and Flux • Surfaces and Area • Surface Integrals

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lectures: during the week, the theoretical lectures will be presented throughout the semester; the discussion of practical work within the lab will be organized and illustrated with activities. Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on a weekly basis. Quizzes: the contents of each lecture will be discussed during class for open questions and answers to make sure every student will participate and be active. Practical Discussion: during the practical session, the students will combine as partners and form a group to discuss their class learning and open tutorials on the topics. In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics during class to top up their challenge packs to be more active
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	HomeWorks	4	10% (10)	3, 7, 11, and 13	All
	Quizzes	3	30% (30)	4, 12 and 14	All
Summative assessment	Midterm Exam	1hr	10% (10)	8	LO #1 - #5, LO#9 - #12
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Parametric Equations and Polar Coordinates • Parametrizations of Plane Curves • Calculus with Parametric Curves
Week 2	Parametric Equations and Polar Coordinates • Polar Coordinates • Graphing Polar Coordinate Equations
Week 3	Parametric Equations and Polar Coordinates • Graphs of Polar Coordinates • Areas and Lengths in Polar Coordinates
Week 4	• Conic Sections • Conics in Polar Coordinates
Week 5	Change from Cartesian to polar coordinates
Week 6	Vectors and the Geometry of Space • Vectors • The Dot Product
Week 7	Vectors and the Geometry of Space • Lines and Planes in Space • Cylinders and Quadric Surfaces
Week 8	Vectors in Two Space
Week 9	Vectors in Three Space
Week 10	Vector-Valued Functions and Motion in Space • Curves in Space and Their Tangents • Integrals of Vector Functions; Projectile Motion
Week 11	Vector Valued Functions • Arc Length in Space • Curvature and Normal Vectors of a Curve
Week 12	Differentiation and integration of vectors
Week 13	Integrals and Vector Fields • Line Integrals • Vector Fields and Line Integrals: Work, Circulation, and Flux
Week 14	Integrals and Vector Fields • Surfaces and Area
Week 15	Integrals and Vector Fields • Surface Integrals

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Text and Books	• "Thomas Calculus" G. Thomas, M. Weir, et al., 13th edition, 2014.	Yes
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.