هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Specification

Course Title:	Calculus 2
Course Code:	MH 132
Program:	Basic Sciences and Humanities
Department:	Computer Science
College:	College of Science
Institution:	Majmaah University
Version:	2
Last Revision Date:	26-02-2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3(2+2)				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered: **Level 4**					
4. Course general Description This course includes the following topics: 1) Integration Techniques: Review of Integration by Substitution and Integration by Parts, Integration of Rational Functions Using Partial Fractions, Trigonometric Techniques of Integration, and Integrals involving logarithmic, exponential, and hyperbolic functions, Improper Integrals. 2) Infinite series: Sequences and limit of a sequence. Infinite series of constant terms, convergence tests, alternating series and absolute convergence. Power series, the ratio test, and radius of convergence; Taylor and McLaurin series. 3) Vectors and Geometry of Space: Vectors in Space, Dot Product, Cross Product, Lines and Planes in Space, Cylindrical and Spherical Coordinates. 4) Parametric Equations and Polar Coordinates: Plane Curves and Parametric Equations, Calculus and Parametric Equations, Polar Coordinates, Calculus and Polar Coordinates. 5) Functions of several variables and Partial Differentiation: Functions of several variables, Partial derivatives, Total derivative, and Chain rule. 6) Multiple Integrals: Double and Triple Integrals in Cartesian Coordinates; Areas and Volumes, Double Integrals in Polar Coordinates; Triple Integrals in Cylindrical and Spherical Coordinates.					
5. Pre-requirements for this course (if any): MATH 112: Calculus 1					
6. Co- requirements for this course (if any): **N/A**					
7. Course Main Objective(s) This course aims at giving student knowledge in fields: 1. Manipulate the integration of complicated functions and evaluate double and triple integrals. 2. Use various tests to determine series convergence and successfully solve problems involving infinite series. 3. Use polar coordinates and their applications in the parametric equations. 4. Differentiate functions of two and three variables.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	40	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	40
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	40

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.1	- Having the knowledge of different coordinates in plane and space. - Identify the different form of equation of conic sections and their properties. - Knowledge of plane and straight line in space. -Knowledge of quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).	K1	**Direct teaching**: Inquiry-based instruction PowerPoints and discussions **Aimed teaching**: Discovery and oral questions	• Homework • Quiz • Midterm • Final Exam • E-exam • Oral Exam
1.2				
…				
2.0	Skills			
2.1	The students will be able to write geometrical problems in mathematical forms.		**Direct teaching**: Lectures Differentiation **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Peer Learning	• Homework • Quiz • Midterm • Final Exam
2.2	The students will explain and interpret a general knowledge of geometry such as		**Direct teaching**: Lectures	• Homework • Quiz • Midterm • Final Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	graphing of conic sections and finding the different form of equations of line and plane.		**Aimed teaching**: Discovery and oral questions **Indirect teaching**: Peer Learning	
…				
3.0	Values, autonomy, and responsibility			
3.1	The students should be able to formulate and solve mathematical problems such as: - finding the different types of equations of a conics sections - the study of point, line and plane in three dimensional		**Direct teaching**: Lectures **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Cooperative Learning	• Homework • Quiz • Midterm • Final Exam
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Review of Integration by Substitution and Integration by Parts, Integration of Rational Functions Using Partial Fractions	4
2.	Trigonometric Techniques of Integration, Integrals involving logarithmic, exponential, and hyperbolic functions, Improper Integrals.	4
3.	Sequences and limit of a sequence. Infinite series of constant terms, convergence tests, alternating series and absolute convergence.	4
4.	Power series, the ratio test, and radius of convergence; Taylor and MacLaurin series.	4
5.	Vectors in Space, Dot Product, Cross Product	4
6.	Lines and Planes in Space Cylindrical and Spherical Coordinates.	4
7.	Plane Curves and Parametric Equations, Calculus and Parametric Equations	4

8.	Polar ordinates, Calculus and Polar Coordinates.	2
9.	Functions of several variables, Partial derivatives, Total derivative, Chain rule.	4
10.	Double and Triple Integrals in Cartesian Coordinates; Areas and Volumes, Double Integrals in Polar Coordinates	4
11.	Triple Integrals in Cylindrical and Spherical Coordinates.	2
Total		40

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Midterm**	**6th week**	30%
2.	**Electronic Test**	**10th week**	10%
3.	**Quizzes**	**Through of semester**	10%
4.	**Final Exam**	**End of semester**	40%
5.	**Presentation**	**Through of semester**	5%
6.	**Homework**	**Through of semester**	5%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Robert Smith, Roland Minton "Calculus, Early Transcendental Functions" McGraw-Hill, 4 edition (2012). ISBN 978–0–07–338311–8
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Classroom with capacity of 30-students. - Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical software packages like MATHEMATICA
Other equipment (depending on the nature of the specialty)	https://www.intmath.com/plane-analytic-geometry/intro.php http://mathworld.wolfram.com/topics/Geometry.html

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Effectiveness of students assessment		
Quality of learning resources	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
The extent to which CLOs have been achieved	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	