Course Specifications

Course Title:	**Calculus-II**
Course Code:	**MH 132**
Program:	**Basic Science**
Department:	**Basic Science**
College:	**College of Computer and Information Sciences**
Institution:	**Majmaah University**

Table of Contents

A. Course Identification

1. Credit hours: 3(4,0,1)
2. Course type **a.** University ☐ College ☑ Department ☐ Others ☐ **b.** Required ☐ Elective ☐
3. Level/year at which this course is offered: **Level 4**
4. Pre-requisites for this course (if any)**: MATH 112: Calculus 1**
5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	55	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	44
2	Laboratory/Studio	
3	Tutorial	11
4	Others (specify)	
	Total	55
Other Learning Hours*		
1	Study	
2	Assignments	
3	Library	
4	Projects/Research Essays/Theses	
5	Others (specify)	
	Total	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Catalog 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.

2. Course Main Objective

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.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
2	**Skills :**	
3	**Competence:**	
3.1	CLO (1) Manipulate the integration of complicated functions and evaluate double and triple integrals	C2
3.2	CLO (2) Use various tests to determine series convergence and successfully solve problems involving infinite series.	C2
3.3	CLO (3) Use polar coordinates and their applications in the parametric equations.	C2
3.4	CLO (4) Differentiate functions of two and three variables.	C2

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.	4
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.	4
Total		**44**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
2.0	**Skills**		
3.0	**Competence**		
3.1	CLO (1) Manipulate the integration of complicated functions and evaluate double and triple integrals	Classroom Teaching	Quiz, Mid- Exam, Final Exam
3.2	CLO (2) Use various tests to determine series convergence and successfully solve problems involving infinite series.	Classroom Teaching	Quiz, Mid- Exam, Final Exam
3.3	CLO (3) Use polar coordinates and their applications in the parametric equations.	Classroom Teaching	Quiz, Mid- Exam, Final Exam
3.4	CLO (4) Differentiate functions of two and three variables.	Classroom Teaching	Quiz, Mid- Exam, Final Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	Week 3	10%
2	Assignment 1	Week 3	10%
3	Midterm	Week 6	20%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
4	Assignment 2	Week 7	10%
5	Quiz 2	Week 9	10%
	Final Exam	Week 12	%40

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Each student is allotted to an academic advisor for guidance and counselling

F. Learning Resources and Facilities

1.Learning Resources

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

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom
Technology Resources (AV, data show, Smart Board, software, etc.)	PC or Laptop with Windows/Linux, Smart Board, Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Internet Connection

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Answer Scripts Verification	Peer faculty members	Review
Course Feedback	Students	Survey

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	