Kingdom of Saudi Arabia
Ministry of Higher Education
College of Computer & Information Sciences
Majmaah University

College of Computer
and Information Sciences
كلية علوم الحاسب والمعلومات

جامعة المجمعة
Majmaah University

Course Profile

Course Name:-	Calculus (2)
Course Code:-	MATH-126
Academic Year:-	1434-1435H
Semester:-	1

Course Overview

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, 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 MacLaurin 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, 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.

Course Details

Level:-	4
Credit:-	3 (3+0+1)
Pre-Requisites:-	MATH 112
Co- Requisites:-	**Nil**

Learning Outcomes of Course

After successful completion of this course, student will be able to-
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.

Course Assessment

Name of Assessment Task	Weight of Assessment	Week Due
1. Midterm Exam-1	20%	7th
2. Midterm Exam-2	20%	12th
3. Quizzes	10%	4th , 9th , 12th
4. Assignments/Report/Seminar	10%	5th , 8th, 11th, 14th
5. Final Exam	40%	16th

Assessment Task and Learning Outcomes Alignment

Assessment Task Name	Course Learning Outcomes					
	1	2	3	4	5	6
1. Midterm Exam-1	√					
2. Midterm Exam-2		√	√			
3. Quizzes	√	√	√	√		
4. Assignments/Report/Seminar	√	√	√	√		
5. Final Exam	√	√	√	√		

Teaching Contact Details

Name of Course Coordinator:-	Dr. Sunil Kumar Sharma
Email of Course Coordinator:-	s.sharma@mu.edu.sa
Lab/Tutorial Instructor:-	N/A
Email of Lab/Tutorial Instructor:-	N/A

Office Hours:-	Monday 11 am-12 am, Thursday 11.00 am -12. Pm
Office Number:-	024-1-18-1
Office Phone Number:-	00966-16404-5388

Details of Required Text Book

Book Name	Authors Name	Publisher	Year	Edition
1. Calculus, Early Transcendental Functions	Robert Smith, & Roland Minton	McGraw-Hill Science Engineering	2007	

Details of Required Reference Books

Book Name	Authors Name	Publisher	Year	Edition
1. Calculus Early Transcendentals	C. Henry Edwards, David E. Penney	Prentice Hall	2008	
2. Calculus	L. Hostetler & Edwards	Houghton Mifflin Publisher	2005	8th
3. Calculus	O. Swokowski, et al	PWS Pub. Co.	1994	6th

IT Resources

The following IT Resources will require to access-
1. https://www.desmos.com/
2. http://tutorial.math.lamar.edu/

Course Schedule

Course Topics	Book's Chapter	Event Name	Week Due
Review of Integration by Substitution and Integration by Parts, Integration of Rational Functions Using Partial Fractions,	**Chapter..7 Integration Technique**		Week-1
Trigonometric Techniques of Integration, Integrals involving logarithmic, exponential, and hyperbolic functions,	**Chapter..7 Integration Technique**		Week-2
Improper Integrals.	**Chapter..7 Integration Technique**		Week-3

Sequences and limit of a sequence. Infinite series of constant terms, convergence tests	**Chapter..9 Infinite Series**		Week-4
convergence tests, alternating series and absolute convergence.	**Chapter..9 Infinite Series**	Quize-1	Week-5
Power series, the ratio test, and radius of convergence;	**Chapter..9 Infinite Series**	Assignment-1	Week-6
Taylor and MacLaurin series.	**Chapter..9 Infinite Series**	Midterm 1	Week-7
Vectors in Space, Dot Product, Cross Product, Lines and Planes in Space	**Chapter 11.. Vectors and the Geometry Space**	Assignment-2	Week-8
Cylindrical and Spherical Coordinates.	**Chapter 11.. Vectors and the Geometry Space**	Quize-2	Week-9
Plane Curves and Parametric Equations, Calculus and Parametric Equations	**Chapter 10.. Parametric Equations and Polar Coordinates**		Week-10
Polar ordinates, Calculus and Polar Coordinates.	**Chapter 10.. Parametric Equations and Polar Coordinates**	Assignment-3	Week-11
Functions of several variables, Partial derivatives,	**Chapter 13..**	Midterm -2	Week-12
Total derivative, Chain rule.	**Chapter 13..**	Assignment-4	Week-13
Double and Triple Integrals in Cartesian Coordinates; Areas and Volumes, Double Integrals in Polar Coordinates;	**Chapter .. 14 Multiple Integrals**	Quize-3	Week-14
Triple Integrals in Cylindrical and Spherical Coordinates.	**Chapter .. 14 Multiple Integrals**		Week-15
		Final Examination	Exam Week

Referencing Style

The **American Psychological Association (APA)** referencing style must be use for all submissions of this course.

Course Assessment Task

Assessment Name:-	Midterm Exam-1
Description of Task Assessment:-	**The closed book written examinations of 2 hour will be conducted. The questions will be asked in this paper are of remembering, understanding, application and analysis level question which will in turn increase the**

	mathematical logical skill, linguistic and spatial skill.
Task Assessment Due Week/Date:-	**7th**
Return Week/Date to Students:-	**8th**
Weight of Task Assessment:-	**20%**
List of Learning Outcomes Assessed:-	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.

Assessment Name:-	Midterm Exam-2
Description of Task Assessment:-	This assignment is aligned to learning outcomes 1, 2 and 3. In that regard, the assignment contains questions that assess: 1) Students are able to distinguish among the main types of conic sections based on the discriminant criterion 2) Students' are able to devise parametric representations for conic sections and other relations. 3) Students' are able compute the length of a curve segment from its parametric representation. 4) Students' are able to apply basic anti-differentiation techniques to selected problems arising in various fields of modelling such as physical modeling . 5) Students' are able to determine the Taylor series of the nth order and determine an upper bound on its remainder. 6) Students' are able to find the sum of the series with the help of Laurents's expansion.
Task Assessment Due Week/Date:-	**11th**
Return Week/Date to Students:-	**12th**
Weight of Task Assessment:-	**20%**
List of Learning Outcomes Assessed:-	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.

Assessment Name:-	Final Exam

Weight of Task Assessment:-	**40%**
Duration:-	**3-hours**
Warning:-	**Nil**
List of Learning Outcomes Assessed:-	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.