

Mutah University

Faculty of Science

Mathematic and Statistics Department



جامعة مؤتة

كلية العلوم

قسم الرياضيات والاحصاء

Calculus (2) Course Syllabus

Course Code	Course Name	Credits	Contact Hours
0301102	Calculus (2)	3	48

INSTRUCTOR/COORDINATOR

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TEXTBOOK

Calculus - Early Transcendentals by Jon Rogawski & Colin Adams, 4th Edition

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

The course aims at studying different areas as follows:

Firstly, trigonometric substitution, partial fractions, improper integrals, length of curves, Lengths of curves defined parametrically, area of a surface, polar coordinates, area in polar coordinates.

Secondly, sequences, and their convergent properties, infinite series, non-negative series, integral test, comparison test, ratio test, root test, alternating series, absolute convergence, conditionally convergence, power series, Taylor series, polynomial approximation and Taylor's theorem, binomial series.

Thirdly, conic Sections: a) The parabola b) The ellipses c) The hyperbola, d) Rotation of axes: The dot product, the cross product, lines in space, planes in space.

B. Pre-requisites (P) or Co-requisites (C)

Calculus (1) 0301101

C. Course Type (Required or Elective)

Required (Compulsory Faculty Course)

SPECIFIC GOALS

A. Specific Outcomes of Instruction

Upon successful completion of the course, the student should be able to do the following:

1. Integration [SLO 1]

- a. Determine the indefinite integrals and compute definite integrals of algebraic and transcendental functions using various techniques of integration including integration by parts, trigonometric substitution, and partial fraction decomposition.
- b. Compute improper integrals using the appropriate limit definitions.
- c. Solve problems involving separable differential equations.

2. Sequences and Series [SLO 1]

- a. Compute the limit of sequences.
- b. Compute the sum of a basic series using its n th partial sum.
- c. Compute the sum of geometric and telescoping series.
- d. Determine if a series converges using the appropriate test, such as the n th term, integral, p -series, comparison, limit comparison, ratio, root, and alternating series tests.
- e. Determine if a series converges absolutely, converges conditionally or diverges.

3. Properties of power series [SLO 1]

- a. Compute the radius and interval of convergence of a power series.
- b. Compute the Taylor polynomials of functions.
- c. Compute basic Taylor series using the definition.
- d. Compute Taylor series using function arithmetic, composition, differentiation, and integration.
- e. Compute limits with Taylor series.
- f. Approximate definite integrals with Taylor series and estimate the error of approximation.
- g. Determine the sum of a convergent series using Taylor series.

4. Applications of integration [SLO 1]

- a. Compute volumes and areas of surfaces of solids of revolution.
- b. Compute length of curves.
- c. Apply integration using alternative coordinate forms and using a parameter.

B. Student Outcomes Addressed by the Course

1	2	3	4	5	6	7				
✓										

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Secondly, sequences, and their convergent properties, infinite series, non-negative series, integral test, comparison test, ratio test, root test, alternating series, absolute convergence, conditionally convergence, power series, Taylor series, polynomial approximation and Taylor's theorem, binomial series.

Thirdly, conic Sections: a) The parabola b) The ellipse c) The hyperbola, d) Rotation of axes: The dot product, the cross product, lines in space, planes in space.

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Trigonometric substitution, partial fractions, improper integrals, length of curves, Lengths of curves defined parametrically, area of a surface, polar coordinates, area in polar coordinates.	4	12 hours
Sequences, and their convergent properties, infinite series, non-negative series, integral test, comparison test, ratio test, root test, alternating series, absolute convergence, conditionally convergence, power series, Taylor series, polynomial approximation and Taylor's theorem, binomial series.	4	12 hours
Conic Sections: a) The parabola b) The ellipse c) The hyperbola, d) Rotation of axes: The dot product, the cross product, lines in space, planes in space.	3	9 hours
Final Exam	1	3 hours
Total	16	48 hours

METHODS OF ASSESSMENT			
No.	Method of assessment	Week and Date	%
1	First Mid-term exam	8 th week	30
2	Homework, Quizzes, Attendance	During the Semester	20
4	Final Examination	Final Week	50
Total			100