

**NEAR EAST UNIVERSITY - COMMON COURSES COORDINATION UNIT**



Department of Mathematics  
Course Information Sheet & Course Outline

<b>Course Code</b> MTH102	<b>Course Name</b> CALCULUS II	<b>Credit</b> 4	<b>ECTS</b> 6
<b>Pre-requisite: MTH101</b>			
<b>Language: English</b>		<b>Course Type: Compulsory</b>	<b>Year: 2019/2020</b>
<b>Semester: Spring</b>			

Weekly Hours	Class Hours	Laboratory	Practicum	Learning Sessions			
				PS	C	R	T
	4		-				

**Learning Outcomes**

After the completion of this course, the student will be able to

- ▶ represent functions as convergent series and approximate their values
- ▶ solve problems involving tangents, areas, arc length, surface area of curves represented by parametric equations
- ▶ evaluate double, triple integrals, take more advanced courses in mathematics and engineering
- ▶ apply their knowledge to solve practical problems they encounter in mathematics and engineering

**Course Description**

Sequences, Infinite series, Geometric series, The Integral test, The Comparison tests, Power series, Taylor and Maclaurin series, Lines and planes, Functions of several variables, Limits and Continuity, Partial Differentiation, Chain Rule, Tangent plane, Critical points, Global and Local Extrema, Directional Derivatives, Gradient, Divergence and Curl, Multiple integrals with applications, Triple integrals with applications, Triple integrals in Cylindrical and Spherical coordinates, Line-, Surface- and Volume Integrals, Independence of path, Green's Theorem, Conservative Vector Fields, Divergence Theorem, Stoke's Theorem.

**Course Objectives**

The course continues Calculus I, where students have learned about limits and derivatives of functions of one variable. The main objectives of Calculus II include teaching the students the basic techniques of integration for functions of several variable, and introduce to them the notion of infinite series and their convergence and divergence criteria, and how they can be used in approximation techniques, as well as many applications of the integral to physical problems such as computing areas, surfaces and volumes.

**Textbooks and/or References**

1	CALCULUS James Stewart International Student Edition, 2019
2	Early Transcendental Functions R.Smith, R.Minton 3rd.edition, 2007
3	THOMAS' CALCULUS ,Weir , Hass, Giordano Eleventh Edition - 2005
4	CALCULUS 5th edition Robert A.ADAMS 2003
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- Course Content**
1. Sequences of Real Numbers and Infinite Series
  2. The Integral Test, Comparison Tests, Alternating Series, Absolute Convergence and the Ratio Test
  3. Plane Curves and Parametric Equations, Calculus and Parametric Equations
  4. Power Series, Taylor Series
  5. Plane Curves and Parametric Equations, Calculus and Parametric Equations
  6. Arc Length and Surface Area in Parametric Equations, Polar Coordinates, Calculus and Polar Coordinates
  7. Vector Functions, The Calculus of Vector Functions, Motion in Space.
  8. Curvature, Tangent and Normal Vectors
  9. Functions of Several Variables, Limits and Continuity.
  10. Partial Derivatives, The Chain Rule
  11. Extrema of Functions of Several Variables, Constrained Optimization and Lagrange Multipliers.
  12. Double Integrals, Area, Volume, and Center of Mass. Double Integrals in Polar Coordinates, Surface Area.
  13. Triple Integrals, Cylindrical Coordinates, Spherical Coordinates.
  14. Vector Fields, Line Integrals