School of Engineering and Natural Sciences / Computer Engineering (English)

2023 - 2024 Academic Year

CALCULUS II

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
CALCULUS II	COE1110751	Fall Semester	4+0	4	6

Prerequisites Courses	MATEMATİK I
Recommended Elective Courses	
Language of Instruction	English
Course Level	First Cycle (Bachelor's Degree)
Course Type	Required
Course Coordinator	Assist.Prof. Özge BİÇER ÖDEMİŞ
Name of Lecturer(s)	Assist.Prof. Özge BİÇER ÖDEMİŞ
Assistant(s)	
Aim	To teach fundamental math contents, methods and techniques, and its applications for the study of Engineering.
Course Content	This course contains; Parametric Equations and Polar Curves,Parametric Equations and Polar Curves,Vectors and Geometry of Space: Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Cylinders and Quadric Surfaces ,Vectors and Geometry of Space: Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Cylinders and Quadric Surfaces ,Functions of Several Variables: Limits and Continuity, PartialDerivatives, Directional Derivative,Functions of Several Variables: Limits and Continuity, Partial Derivatives, Directional Derivative,Extreme Values of Multivariable Functions, Lagrange Multiplier,Extreme Values of Multivariable Functions, Lagrange Multiplier,Multiple Integrals: Double Integrals, Areas, DoubleIntegrals in Polar Form, Triple Integrals in Rectangular,Cylindirical and SphericalCoordinates,Multiple Integrals: Double Integrals, Areas, Double Integrals in Polar Form, Triple Integrals in Rectangular,Cylindirical and Spherical Coordinates,Infinite Sequences: Limits of Sequences of Numbers, Subsequences, Monotonic Sequence Theorem,Infinite Sequences and Series: Series of Nonnegative Terms, Alternating Series, Absolute and Conditional Convergence,Power Series: Interval of Convergence, Radius of Convergence, Term by Term Differentiation, Term by Term Integration,Taylor Series.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Use the concept of polar coordinates to find areas, arc length of curves, and representations of conic sections.	12, 14, 9	A, E
2. Apply dot or cross product to calculate angles between vectors, orientation of axes, areas of triangles and parallelograms in space, scalar and vector projections, volumes of parallelepipeds and distance between a point and a plane in the space.	12, 14, 9	A, E
3. Recognize multivariable functions to compute limits, partial derivatives and directional derivatives, extreme values, tangent planes graphically, numerically and algebraically.	12, 14, 9	A, E
4. Use multiple integrals to compute areas and volumes.	12, 14, 9	A, E
5. Determine convergence or divergence of sequences and series.	12, 14, 9	A, E
6. Find Power and Taylor Series of a function.	12, 14, 9	A, E

Teaching Methods	12: Problem Solving Method, 14: Self Study Method, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam, E: Homework

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Parametric Equations and Polar Curves	Polynomial functions, Power functions, Trigonometric functions, Derivative of a function, Chain rule.
2	Parametric Equations and Polar Curves	Polynomial functions, Power functions, Trigonometric functions, Derivative of a function, Chain Rule.
3	Vectors and Geometry of Space: Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Cylinders and Quadric Surfaces	Equations of lines and circles, Real space
4	Vectors and Geometry of Space: Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Cylinders and Quadric Surfaces	Equations of lines and circles, Real space.
5	Functions of Several Variables: Limits and Continuity, PartialDerivatives, Directional Derivative	Single Variable Functions, Limit and Continuity, Derivative
6	Functions of Several Variables: Limits and Continuity, Partial Derivatives, Directional Derivative	Single Variable Functions, Limit and Continuity, Derivative
7	Extreme Values of Multivariable Functions, Lagrange Multiplier	Derivative, Extreme Values of Single Variable Functions
8	Extreme Values of Multivariable Functions, Lagrange Multiplier	Derivative, Extreme Values of Single Variable Functions
9	Multiple Integrals: Double Integrals, Areas, DoubleIntegrals in Polar Form, Triple Integrals in Rectangular,Cylindirical and SphericalCoordinates	Definite Integrals, Polar Coordinates
10	Multiple Integrals: Double Integrals, Areas, Double Integrals in Polar Form, Triple Integrals in Rectangular,Cylindirical and Spherical Coordinates	Definite Integrals, Polar Coordinates
11	Infinite Sequences: Limits of Sequences of Numbers, Subsequences, Monotonic Sequence Theorem	Functions, Limit
12	Infinite Sequences and Series: Series of Nonnegative Terms, Alternating Series, Absolute and Conditional Convergence	
13	Power Series: Interval of Convergence, Radius of Convergence, Term by Term Differentiation, Term by Term Integration	Absolute Value, Integral, Derivative
14	Taylor Series	

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources
Thomas' Calculus, 12th ed., G. B. Thomas, Jr. and M. D. Weir and J. Hass, Addison-Wesley