T.C. ESKİŞEHİR OSMANGAZİ UNIVERSITY
ENGINEERING AND ARCHITECTURE FACULTY
MECHANICAL ENGINEERING DEPARTMENT

COURSE INFORMATION FORM

SEMESTER	SPRING

COURSE CODE	151812211	COURSE NAME	CALCULUS II

SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
2	4	0	0	4	6	COMPULSORY (X) ELECTIVE ( )	ENGLISH

COURSE CATAGORY			
Basic Science	Basic Engineering	Mechanical Engineering Profession [if it contains considerable design, mark with (√)]	Social Science
X			

ASSESSMENT CRITERIA			
	Evaluation Type	Quantity	%
MID-TERM	1st Mid-Term	1	%50
	2nd Mid-Term		
	Quiz		
	Homework		
	Project		
	Report		
	Others (……)		
FINAL EXAM		1	%50

PREREQUIEITE(S)	none
COURSE DESCRIPTION	Series, vectors, operations, dot and cross product, vector functions, gradient, divergence, rotation, partial derivatives, directional derivative, arc length, wire systems, center of gravity, inertia calculations, path/area integrals, work, multiple integrals, COM and inertia for planar systems, volume calculations, Divergance and Stokes theorems and applications
COURSE OBJECTIVES	To provide the basic mathematical skills required of engineering students
ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	Basic mathematical knowledge and ability to apply engineering applications
COURSE OUTCOMES	1. Ability to use various convergence tests to series 2. Ability to deal with vectors and vector operations 3. Understanding partial differentiation and multi-variable calculus its applications 4. Ability to apply integration techniques to calculate arc length, area, volume and surface area calculations
TEXTBOOK	Thomas, Weir, Hass, Giardino, Thomas' Calculus, 11th Ed., Addison & Wesley Publication. 2009
OTHER REFERENCES	F. Ayres, Differential and Integral Calculus, Schaum Series. 1984
TOOLS AND EQUIPMENTS REQUIRED	Course Management System (Moodle) is incroporated into the external course tools.

COURSE SYLLABUS	
WEEK	**TOPICS**
1	Series, geometric, harmonic and p-series, convergence tests, comparison, root and ratio tests. Absolute convergence concept. Taylor and MacLaurin series and convergence intervals.
2	Arc length for cartesian, polar and parametric curves, wire/cage systems, center of gravity (COG) and inertia moment calculations
3	Vectors, properties, dot and cross product. Projection of vectors. Vector functions, derivatives, position, velocity and acceleration vectors, tangential and normal components of acceleration
4	Path integrals and work calculations. Dependence/independence of work on path.
5	Multiple variable functions. Partial derivatives, generalized chain rule, implicit partial differentiation.
6	Critical points and types. Gradient, divergence, curl of a vector/scalar functions, directional derivative
7	Double integrals, area calculations in cartesian, polar and homothetic coordinate systems.
8	Mid-Term Examination
9	COG and inertia calculations for homogeneous and inhomogeneous planar systems.
10	Green's theorem and its applications, work independent of path
11	Quadratic surfaces, surface equations, Planes, cones, paraboloids, sphere, spheroids etc. Triple integrals
12	Calculation of volume of a 3D bodies in cartesian, cylindrical, spherical and toroidal coordinates. COG and inertia moment calculations for homogeneous 3D systems. COG and inertia moment calculations for inhomogeneous 3D systems
13	Surface integrals, surface parametric equations, surface area element. Surface area calculations COG and inertia moment calculations for homogeneous surface systems
14	Stokes and Divergence theorem and its applications
15,16	Final Exams

NO	PROGRAM OUTCOMES	3	2	1
1	Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems.	**X**		
2	Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.		**X**	
3	Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods.			**X**
4	Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies.	**X**		
5	In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.			**X**
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.			**X**
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.		**X**	
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.		**X**	
9	Understanding of professional and ethical issues and taking responsibility			**X**
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.			**X**
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.			**X**
1: None. **2**: Partially contribution. **3**: Completely contribution.				

Instructor(s): Prof. Dr. Zekeriya ALTAÇ

Signature: **Date:** 01.11.2021