

COURSE PROFILE

Course Name	Code	Semester	Term	Theory +PS+Lab. (hour/week)	Local Credits	ECTS
Calculus III	MATH 201	Fall	3	3+2+0	4	7

Prerequisites	Math101
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Course Language	English
Course Type	Required
Course Lecturer	<ul style="list-style-type: none"> • Prof. Dr. Hilmi Demiray
Course Assistant	<ul style="list-style-type: none"> • Ali Erinç Özden
Course Objectives	This course aims to provide basic theory and applications of multivariable calculus and vector analysis. Advanced calculus is the most useful mathematical tool, and it is a good preparation for students thinking of studying on the problems of engineering.
Course Learning Outcomes	<p>The students who succeeded in this course;</p> <ul style="list-style-type: none"> • will be able to calculate limits and partial derivatives of functions of several variables. • will be able to find critical point(s) of functions of several variables, max/min values and find the tangent plane to the function at given point. • will be able to evaluate the double integrals, the volume and the surface area. • will be able to evaluate the triple integrals, calculate triple integrals in rectangular and cylindrical coordinates. • will be able to apply work and line integrals. • will be able to use Green's theorem. • will be able to will be able to solve surface integrals and flux. • will be able to use Stokes' theorem and divergence theorem.
Course Content	Functions of several variables, limits and continuity. Partial derivatives, directional derivatives, Lagrange multipliers, Taylor's formula. Double integrals in Cartesian and polar coordinates, triple integrals in Cartesian, cylindrical and spherical coordinates, line integrals, Green's theorem, surface integrals, Stokes' theorem, divergence theorem.

COURSE CONTENT

Week	Subjects	Related Preparation
1	Multivariable Functions, Limits and continuity, Partial derivatives, Implicit partial differential.	Chapter 14
2	Euler's method for mixed derivatives, Linearization, Differentials.	Chapter 14
3	Functions of more than one variable, Chain rule for differentiation, Implicit differentiation	Chapter 14
4	Partial derivative with constrained variable, Directional derivative, Gradient and tangent vectors, Equation of tangent plane, normal lines.	Chapter 14
5	Extreme values and saddle points, Absolute maxima-minima, Local maxima-minima.	Chapter 14
6	Lagrange multipliers, Lagrange multipliers with two constraints.	Chapter 14
7	Taylor's formula, Derivation of second derivative test, Multiple integrals, Fubini's theorem for double integral. Midterm I	Chapter 14, Chapter 15
8	Finding the limits of integration, Areas, moments and center of mass	Chapter 15
9	Double integrals in polar form, Triple integrals in cartesian coordinates	Chapter 15
10	Triple integrals in cylindrical and spherical coordinates, Substitution in multiple integrals.	Chapter 15
11	Line integrals, Vector fields, Work, circulation and flux, Path independence of integrals	Chapter 16
12	Green's theorem in plane, Extending Green's theorem to multiply connected regions. Midterm II	Chapter 16
13	Surface integrals, Parametrized surface integrals	Chapter 16
14	Stoke's theorem, Divergence Theorem	Chapter 16

Course Textbooks	Thomas' Calculus Early Transcendentals 11 th Edition / Weir, Hass, Giordano, Addison - Wesley Publishing Company, 2006
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Recommended References	<p>Calculus with analytic geometry / C.H. Edwards, Jr., David E. Penney. Englewood Cliffs, N.J., Prentice Hall, c1994. 4th ed.</p> <p>Calculus with analytic geometry / Howard Anton; in collaboration with Albert Herr. New York, Wiley, c1995. 5th ed.</p>
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Semester Requirements	Number	Percentage of Grade
Attendance/Participation	-	-
Laboratory	-	-
Application	-	-
Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	2	15
Homework Assignments	6	-
Presentation	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	2	35
Final/Resit Exam	1	50
Total	11	100

PERCENTAGE OF SEMESTER WORK	10	50
PERCENTAGE OF FINAL WORK	1	50
Total	17	100

Course Category	Core Courses	X
	Major Area Courses	
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution				
		1	2	3	4	5
1	To have a grasp of basic mathematics, applied mathematics and theories and applications of statistics.					X
2	To be able to use theoretical and applied knowledge acquired in the advanced fields of mathematics and statistics,					X
3	To be able to define and analyze problems and to find solutions based on scientific methods,					X
4	To be able to apply mathematics and statistics in real life with interdisciplinary approach and to discover their potentials,					X
5	To be able to acquire necessary information and to make modeling in any field that mathematics is used and to improve herself/himself,					X
6	To be able to criticize and renew her/his own models and solutions,					X
7	To be able to tell theoretical and technical information easily to both experts in detail and nonexperts in basic and comprehensible way,				X	
8	To be able to use international resources in English and in a second foreign language from the European Language Portfolio (at the level of B1) effectively and to keep knowledge up-to-date, to communicate comfortably with colleagues from Turkey and other countries, to follow periodic literature,				X	
9	To be familiar with computer programs used in the fields of mathematics and statistics and to be able to use at least one of them effectively at the European Computer Driving Licence Advanced Level,			X		
10	To be able to behave in accordance with social, scientific and ethical values in each step of the projects involved and to be able to introduce and apply projects in terms of civic engagement,				X	
11	To be able to evaluate all processes effectively and to have enough awareness about quality management by being conscious and having intellectual background in the universal sense,				X	
12	By having a way of abstract thinking, to be able to connect concrete events and to transfer solutions, to be able to design experiments, collect data, and analyze results by scientific methods and to interfere,					X
13	To be able to continue lifelong learning by renewing the knowledge, the abilities and the competencies which have been developed during the program, and being conscious		X			

	about lifelong learning,					
14	To be able to adapt and transfer the knowledge gained in the areas of mathematics and statistics to the level of secondary school,				X	
15	To be able to conduct a research either as an individual or as a team member, and to be effective in each related step of the project, to take role in the decision process, to plan and manage the project by using time effectively.					

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
Course Hours (Including Exams)	14	3	48
Tutorials	14	2	28
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	14	2	28
Presentations / Seminar	-	-	-
Project	-	-	-
Preparatory reading	13	2	26
Homework Assignments	6	2	12
Quizzes	2	2	4
Midterm Exams	2	8	16
Final / Resit Exam	1	13	13
		Total Workload	175

COURSE CATEGORY

ISCED GENERAL AREA	GENERAL AREAS	ISCED BASIC AREA	BASIC EDUCATIONAL AREAS	
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CODES		CODES		
1	Education	14	Teacher Training and Educational Sciences	0
2	Humanities and Art	21	Art	0
2	Humanities and Art	22	Humanities	0
3	Social Sciences, Management and Law	31	Social and Behavioral Sciences	0
3	Social Sciences, Management and Law	32	Journalism and Informatics	0
3	Social Sciences, Management and Law	38	Law	0
4	Science	42	Life Sciences	0
4	Science	44	Natural Sciences	0
4	Science	46	Mathematics and Statistics	90
4	Science	48	Computer	0
5	Engineering, Manufacturing and Civil	52	Engineering	10
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	0
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	0
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	0
6	Agriculture	64	Veterinary	0
7	Medicine and Welfare	72	Medical	0
7	Medicine and Welfare	76	Social Services	0
8	Service	81	Personal Services	0
8	Service	84	Transport Services	0
8	Service	85	Environment Protection	0
8	Service	86	Security Services	0