

**FACULTY OF ENGINEERING**  
**1<sup>st</sup> Year 2<sup>nd</sup> Semester**

MAT 102 Mathematics II					FACULTY OF ENGINEERING				
Semester	Methods of Education						Credits		
	Lecture	Recit.	Lab.	Project/ Field Study	Homework	Other	Total	Credit	ECTS Credit
2	56	-	-	-	42	62	160	4	6.0
<b>Language</b>	Turkish / English								
<b>Compulsory / Elective</b>	Compulsory								
<b>Prerequisites</b>	None								
<b>Course Contents</b>	Sequences, series, power series. Polar coordinates, vectors in R <sup>3</sup> , curves, lines and planes. Limit and continuity of multivariable functions, partial differentiation, gradient, tangential plane, directional derivatives, unconditional and conditional maximum/minimum, Lagrange multipliers. Multiple integrals, line integrals and path independence, surface integral.								
<b>Course Objectives</b>	Mathematics is the science of thinking based on intelligence and logic. Therefore anyone working as professional oriented towards mathematics. Mathematics is an indispensable tool especially for engineering sciences. The purpose of this course is to increase the capability of thinking and to implement mathematical methods and topics taught in this course to the technology.								
<b>Learning Outcomes and Competences</b>	The ability both to make analysis and synthesis by examining different aspects of cases and looking multi-dimensionally at events is gained and to use the topics of the mathematics such as series, vectors, multivariable functions, multiple and line integrals, which are used usually in applications of mathematics, in engineering courses and researches is gained.								
<b>Textbook and /or Reference</b>	1-Matematik Analiz ve Analitik Geometri, Edwards& Penney, Çeviri Editörü Prof.Dr. Ömer Akın 2-Genel Matematik, Prof. Dr. Mustafa Balcı 3- Calculus,Robert Ellis-Denny Gulick								
<b>Assessment Criteria</b>							<b>If any, mark as (x)</b>	<b>Percentage (%)</b>	
	<b>Midterm Exams</b>						X	60	
	<b>Quizzes</b>								
	<b>Homeworks</b>								
	<b>Projects</b>								
	<b>Term Paper</b>								
	<b>Laboratory Work</b>								
	<b>Other</b>								
	<b>Final Exam</b>						X	40	
<b>Week</b>	<b>Subject</b>								
<b>1</b>	POLAR COORDINATES : Definition, drawing of an arc, calculation of area, length of an arc and surface area of revolution								
<b>2</b>	SEQUENCES : Definition, types, monotone and finite sequences, subsequence, convergence and divergence of sequences								
<b>3</b>	SERIES : Definition, convergence and divergence, positive series and convergence tests, alternating series, absolute and conditional convergence, power series, radius and interval of convergence								
<b>4</b>	SERIES EXPANSIONS : Taylor , Maclaurin and Binomial series, differentiation and integral of power series, calculations with the help of series								
<b>5</b>	VECTORS : Vector spaces, investigation of vectors in two and three-dimensional spaces,vector operations, linear independence and basis, lines and planes in R <sup>3</sup>								
<b>6</b>	MULTIVARIABLE FUNCTIONS : Definition, domain of definition, graphs, limit and continuity of functions of two variables, partial differentiation								
<b>7</b>	Higher order partial derivatives, chain rule, implicit function derivatives, exact differentiation								
<b>8</b>	APPLICATIONS OF PARTIAL DIFFERENTIATIONS : Gradient, divergence ve rotasyon, directional derivatives, geometrical interpretation of partial derivatives, tangent plane and normal line equation								
<b>9</b>	Taylor expansions of functions of two variables, maxima and minima, conditional maxima and minima,maximum and minimum problems,bölge dönüşümleri ve jacobians								
<b>10</b>	DOUBLE INTEGRALS : Definition, properties, computation, bölge dönüşümleri								
<b>11</b>	APPLICATIONS OF DOUBLE INTEGRALS : Calculation of area, volume, mass and moment, finding of center of masses and calculation of moment of inertia								
<b>12</b>	TRIPLE INTEGRALS : Definition, properties, computation methods, bölge dönüşümleri								
<b>13</b>	APPLICATIONS OF TRIPLE INTEGRALS : Calculation of volume, mass and moment of inertia, finding of center of gravities								
<b>14</b>	LINE INTEGRALS : Definition, properties, fundamentals theorems and path independence, Green's theorem and calculation of area, length of an arc, work, mass, center of gravity and moments of inertia								