ENGINEERING MATHEMATICS

1	Course Title:	ENGINEERING MATHEMATICS	
2	Course Code:	TEK2002	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	4	
7	ECTS Credits Allocated:	5.00	
8	Theoretical (hour/week):	4.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Ögr. Üyesi FATİH SÜVARİ	
15	Course Lecturers:	Yrd. Doç. Dr. Sevda Telli, Yrd. Doç. Dr. Gürsel Şefkat	
16	Contact information of the Course Coordinator:	E-Posta: okopmaz@uludag.edu.tr Tel: +90 224 294 19 62 Posta Adresi: U.Ü., Müh. Mim. Fak., Makine Müh. Bölümü, Görükle, 16059 Bursa	
17	Website:	http://www20.uludag.edu.tr/~mtd/	
18	Objective of the Course:	To transmit to students the applications of linear algebra and higher calculus encountered in various engineering courses along with examples from those courses simultaneously teaching the basic theory knowledge to them To get student have the ability of correct reasoning, and the skill of implementing the results in these branches of mathematics as a tool in engineering problems.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	The students who attend this course can establish and solve engineering problems which can be defined in form of linear algebraic equations,
		2	They can study and solve matrix eigenvalue problems that emerge in vibrations, strength of materials, and similar engineering fields,
		3	They can analyze the general 3-dimensional motion of a particle or body point through vector functions,
		4	They can calculate multiple or line integrals in some engineering sciences such as dynamics, strength of materials, fluid mechanics etc.
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21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Introduction to linear algebra. Matrices and matrix algebra. Special matrices. Set of linear equations. Matrix representation of a set of linear equations.	
2	Method of Gauss elimination in solving linear equations. Existence and uniqueness of solution. Rank of matrices. Relation between the concept of rank and the existence and uniqueness of solution of a set of linear equations.	
3	Determinants. Cramer's method. Inverse matrix. Singular matrix. Solving a set of linear algebraic equations using inverse matrix method, and Gauss-Jordan method.	
4	Matrix eigenvalue problems. Orthogonal matrices. Orthogonality of eigenvectors. Examples from strength of materials, and vibrations.	
5	Vector algebra. Scalar, vector, and mixed product in vectors. 1. quiz.	
6	Vector functions. Serret-Frenet formulas. Osculator plane. Curvature and torsion of	
7	variable functions. Limit, continuity, and derivatives in two variable functions. Partial	
8	Stationary points. Partial and perfect	
9	Direction derivative. Parametric	
10	problems. Method of Lagrange multipliers. Midterm exam + Course review	
11	Double integrals in Cartesian and polar coordinates. Jacobian. Transition to different	
12	Finding of the area of a surface patch. Triple integrals and their application in engineering	
13	fields. Potential functions. Conservative fields. Green's theorem.	
14	Divergence and curl. Integral theorems in vector analysis. Stokes' and Gauss-Ostrogradski theorems. 2. quiz	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	13	3.00	39.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	24.00	24.00
Others	2	12.00	24.00
Final Exams	1	24.00	24.00
Total Work Load			153.00
Total work load/ 30 hr			5.10
ECTS Credit of the Course			5.00

22	Textbooks, References and/or Other Materials:	MAK2002/TEK2002 Engineering Mathematics Lecture Notes, O. Kopmaz-S. Telli, Bursa, 2008.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	25.00
Quiz	2	25.00
Home work-project	0	0.00

Final Exam	1	50.00
Total	4	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24	ECTS / WORK LOAD TABLE

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK2	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK3	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK4	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**