GEOMETRIC ALGEBRA AND APPLIED ANALYSIS II

1	Course Title:	GEOMETRIC ALGEBRA AND APPLIED ANALYSIS II	
2	Course Code:	MAT4114	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	8	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	English	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. Kadri Arslan	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	arslan@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	To introduce Fourier analysis, complex analysis and partial differential equation techniques and principles, teach their use and application through various problems in engineering.	
19	Contribution of the Course to Professional Development:	Contribution to academic development	
20	Learning Outcomes:		
		1	Students gain essential knowledge and skills for further study in partial differential equations, Fourier analysis, complex analysis, conformal mapping and related fields.
		2	Students learn the basic knowledge about the solution of partial differential equations, Fourier analysis and complex analysis with Laurence series.
		3	Students practice on engineering problems related to given course content.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Fourier series, forced oscillations, orthogonal functions.	
2	Orthogonal series, Fourier integral, Fourier cosine and sine transforms.	

3	Partial differential equations, basic concepts of PDEs.	
4	Solution by separating variables, use of Fourier series,	
5	Heat equation, solution by Fourier series, steady two-dimensional heat problems.	
6	Laplacian in polar coordinates, Laplace's equation in cylindrical and spherical coordinates, solution of PDEs by Laplace transforms.	
7	Complex numbers and their geometric representation, polar form of complex numbers, powers and roots.	
8	Cauchy–Riemann equations, Laplace's equation, exponential function, trigonometric, hyperbolic functions.	
9	Complex integration, Line integral in the complex plane, Cauchy's integral formula.	
10	Power series, functions given by power series, Taylor and Maclaurin series.	
11	Laurent Series, singularities and zeros, residue integration method.	
12	Geometry of analytic functions, conformal mapping.	
13	Complex analysis and potential theory, electrostatic fields, use of conformal mapping	

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	14	9.00	126.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	6.00	6.00
Others	0	0.00	0.00
Final Exams	1	6.00	6.00
Total Work Load			180.00
Total work load/ 30 hr	2	100.00	6.00
ECTS Credit of the Course			6.00

Matlab", CRC Press. (2022).

James, G., David Burley, D., Clements D., Dyke P., and Prentice Hall. (2011).

TERM LEARNING ACTIVITIES	**NUMBE**	**WEIGHT**
Midterm Exam	1	40.00
Home work-project	0	0.00
Final Exams	1	60.00
Total	2	100.00

Success Grade	
Contribution of Final Exam to Success Grade	60.00
Total	100.00
Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

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	1	1	2	0	2	2	2	3	3	3	0	0	0	0	0	0

ÖK2	1	2	3	0	2	3	3	4	3	4	0	0	0	0	0	0
ÖK3	2	2	2	0	3	3	3	3	4	3	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**