Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Mathematical Physics II	FZK216	4. Semester	3 + 2	4.0	7.0

Prerequisites	None
Language of Instruction	Turkish
Course Level	Bacheclor's Degree (First Cycle)
Course Type	Compulsory
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Melis ULU DOĞRU
Instructors	Assist. Prof. Dr. Melis ULU DOĞRU
Assistants	
Course Objectives	The course aims to define the matrix, operator, physical operator, coordinate systems, orthogonal and curved coordinate system, coordinate transformation, Fourier series, fourier integral transforms, solving the differential equation with series method, partial differential equations and their solution method and to apply on the physical systems.
Course Content	will be able to use the matrix, features of matrix and matrix algebra, will be able to solve the system of equations and the variables in the physical problems by using matrix be able to calculate eigen value and eigen vector in physical systems , will be able to identify the operator and be able to use and apply the operator algebra, will be able to recognize the partial differential equations and be able to solve to partial differential equations in physics, will be able to solve differential equations using serial methods and determine the general term of the series, will be able to recognize the coordinate systems, be able to transform any physical quantity form one coordinate system to the other
Course Learning Outcomes	1) use the matrix, features of matrix and matrix algebra. 2) solve the system of equations and the variables in the physical problems by using matrix and to calculate eigen value and eigen vector in physical systems. 3) identify the operator for using and appling the operator algebra. 4) recognize the partial differential equations and to solve to partial differential equations in physics. 5) solve differential equations using serial methods and determine the general term of the series. 6) recognize the coordinate systems, to transform any physical quantity form one coordinate system to the other

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials

Quick Access

Physics
- Qualification Awarded
- Level of Qualification
- Qualification Requirements and Regulations
- Specific Admission Requirements
- Recognition of Prior Learning
- Profile of the Program
- Program Key Learning Outcomes
- Occupational Profile of Graduates
- Access to Further Studies
- Course Structure & Credits
- Exam Regulations & Assessment & Grading
- Graduation Requirements
- Mode of Study
- Programme Director(or Equivalent)
- Evaluation Questionnaire
- TYYÇ

Course Information
- Course Information
- Weekly Course Content
- Resources
- Assessment
- Course Category
- CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES
- ECTS credits and course workload

1. Week	Matrices, calculus in the matrix algebra, properties of matrices, determination, cofactor matrix, adjoint matrix, invert matrix	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
2. Week	Solution of the equations systems with matrices, cramer method	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
3. Week	Eigen values and eigen vectors, calculus of eigen values and eigenvectors with matrices	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
4. Week	Operators, hilbert space, linear and hermitian operator, dirac notation	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
5. Week	Operator in physics, gradient, divergence, curl, laplace operator	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
6. Week	Coordinate systems, orthogonal and curved coordinate systems	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
7. Week	Coordinate transformations, midterm exam	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
8. Week	Operators in physics with orthogonal and curved coordinate system	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
9. Week	Fourier series and fourier integral transforms	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
10. Week	Solutions of the differential equations with series method	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
11. Week	Partial differential equations and their solutions method	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
12. Week	Laplace equations and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
13. Week	Thermal spreading equations and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
14. Week	Wave equations and their physical applications	Oral lectures with interactive discussions, Homeworks,	

		Applications, Pratic	
15. Week	general review	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
16. Week	general review, final exam	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	

RESOURCES

Recommended Sources
Fizikte Matematik Yöntemler,Coşkun Önem,Birsen Yayınevi(1982)
Mathematical Methods for Physicists (fifth edition), by G.B. Arfken and H.J. Weber (Harcourt Academic Press, 2001)
Complex Variables and Applications, by R.V. Churchill, J.W. Brown, and R.F. Verhey (McGraw-Hill, 1974)
Mathematical Methods of Physics, by J. Matthews and R.L. Walker (Benjamin, 1970)
Numerical Recipes, by W.H. Press, B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling (Cambridge University Press)

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Mid-term exam %40, final exam %60		
In-Term Studies	**Quantity**	**Percentage**
Mid Term Exam 1	1	40
Total	1	40
End-Term Studies	**Quantity**	**Percentage**
Final Exam	1	60
Total	1	60
Contribution Of In-Term Studies To Overall Grade		40
End-Term Studies		60
Total		100

COURSE CATEGORY

Course Category	Percentage
Core Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5	DK6
PY1	3	3	3	3	3	3	3
PY2	1	1	1	1	1	1	1
PY3	5	5	5	5	5	5	5
PY4	3	3	3	3	3	3	3
PY5	5	5	5	5	5	5	5
PY6	5	5	5	5	5	5	5

PY7	1	1	1	1	1	1	1
PY8	1	1	1	1	1	1	1
PY9	1	1	1	1	1	1	1
PY10	1	1	1	1	1	1	1
PY11	1	1	1	1	1	1	1
PY12	1	1	1	1	1	1	1
PY13	1	1	1	1	1	1	1
PY14	1	1	1	1	1	1	1
PY15	5	5	5	5	5	5	5

*DK = Course's Contrubution.

	0	1	2	3	4	5
Level of contribution	None	Very Low	Low	Fair	High	Very High

.

ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Class Hours (14 weeks)	14	5	70
Final Exam Preparation	1	20	20
Mid Term Exam Preparation	1	20	20
Assignment 1	14	2	28
Application/Practice	14	2	28
Final Exam	1	2	2
Mid Term Exam 1	1	2	2
Further Study	10	1	10
		Total Workload	180
		Total Workload / 25.5 (s)	7.06
		ECTS Credit of the Course	7