Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Mathematical Methods In Physics I	FZ5005		3 + 0	3.0	7.5

Prerequisites	None
Language of Instruction	Turkish
Course Level	Second Cycle
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Melis ULU DOĞRU
Instructors	Assist. Prof. Dr. Melis ULU DOĞRU Prof. Dr. İsmail TARHAN
Assistants	
Course Objectives	The course includes Integral equations, series, calculus of variations, Green's function, group theory and applications and aims to have applicable in any scientific area.
Course Content	The Mathematical Description of Physical Phenomena. Integral Transform, Fourier, Laplace Transforms Integral equations, Complex Variable Techniques Analytic Functions, Power Series Integral Calculations, Taylor and Laurent Expansions Analytic Continuation The Residue Theorem Contour Integral Techniques Variation Calculus Green Function Group Theory Group Theory and applications
Course Learning Outcomes	1) solve the differantial equations with the serial methods 2) recognize the special functions such as the special situations of the serial solutions for differantial equations and applicate these functions to physical systems 3) recognize and use the infinite series. 4) recognize the complex variables and their functions and applicate the functions to physical systems

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Differential equations, Ordinary and Partial Differantial Equations and their solutions methods	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
2. Week	Solutions methods of differantial equations with series methods, Power series, Frobenious method	Oral lectures with interactive discussions,	

Quick Access

Physics (Master)
- 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

		Homeworks, Applications, Pratic	
3. Week	Legendre Functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
4. Week	Bessel Functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
5. Week	Laguerre Functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
6. Week	Hermite Functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
7. Week	Chebyshev and Gauss Functions and their physical applications, midterm exam	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
8. Week	Gamma functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
9. Week	Beta Functions and their physical applications	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
10. Week	Kompleks algebra, Cauchy-Riemann Conditions, Cauchy Integral Theorem, Laurent Expansion, Mapping and Conformal Mapping	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
11. Week	Calculus of Residues	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
12. Week	Integral Transforms, Fourier Transforms, Laplace transforms	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
13. Week	Infinite series, Taylor expansion, Taylor series, Fourier series, Series functions	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
14. Week	Power series, Elliptical integrals, Bernoulli numbers- Euler-Maclaurin Formula	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
15. Week	general review	Oral lectures with interactive discussions, Homeworks, Applications, Pratic	
16. Week	final exam	Exam	

RESOURCES

Recommended Sources
Mathematical Methods for Physicists (fifth edition), by G.B. Arfken and H.J. Weber (Harcourt Academic Press, 2001)
Fizikte Matematik Yöntemler,Coşkun Önem,Birsen Yayınevi(1982)
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)

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Mid-term exam, final exam, other		
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
PY1	3	3	3	3	3
PY2	3	3	3	3	3
PY3	5	5	5	5	5
PY4	5	5	5	5	5
PY5	5	5	5	5	5
PY6	3	3	3	3	3
PY7	4	4	4	3	4
PY8	4	4	4	4	4
PY9	4	4	3	4	4
PY10	3	3	3	3	3
PY11	3	3	3	3	3
PY12	3	3	3	3	3
PY13	3	3	3	3	3
PY14	3	3	3	3	3

PY15	3	4	4	4	4

*DK = Course's Contrubution.

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

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ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Final Exam	1	3	3
Assignment 1	10	4	40
Assignment 2	2	20	40
Class Hours (14 weeks)	14	3	42
Final Exam Preparation	1	20	20
Mid Term Exam Preparation	1	20	20
Mid Term Exam 1	1	3	3
Quiz 1	4	1	4
Application/Practice	14	1	14
Quiz 2	6	1	6
		Total Workload	192
		Total Workload / 25.5 (s)	7.53
		ECTS Credit of the Course	8