Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Special Functions in Physics	FZK305	5. Semester	2 + 2	3.0	4.0

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. Sezgin AYGÜN
Instructors	Assist. Prof. Dr. Sezgin AYGÜN
Assistants	
Course Objectives	This course aims to help students learn solution methods of the special functions except for well-known trigonometric or exponential functions.
Course Content	The special functions except for well-known trigonometric or exponential functions, hypergeometric functions, orthogonal polynomials, other special functions: error functions, elliptic integrals, gamma functions, Bessel functions and their features and applications are given in the lesson
Course Learning Outcomes	1) will have the abilities like as Identification of differential equations which appear from special functions 2) will solve the equations to product the polynomials from the equations 3) will apply the solving methods in the physical problems 4) to recognize special functions and learn its properties.

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Series Solutions (power series and Frobenius methods)		
2. Week	Legendre Differential equation, Legendre Polynomials, properties and applications		
3. Week	Laguerre Differential equation, Laguerre Polynomials, their properties and applications		
4. Week	Bessel Differential equation, Bessel Polynomials, their properties and applications		
5. Week	Hermite Differential equation, Hermite Polynomials, their properties		

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
- CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES
- ECTS credits and course workload

	and applications		
6. Week	Gamma and Beta functions and their applications		
7. Week	Bessel Differential equation, Bessel Polynomials, their properties and applications		
8. Week	Integral transformations and properties		
9. Week	Fourier series, transforms and applications		
10. Week	Laplace transformations, properties and applications		
11. Week	Complex functions and properties		
12. Week	Green functions and applications		
13. Week	Physical applications of special functions I		
14. Week	Physical applications of special functions II		
15. Week	general review	Oral lectures with interactive discussions, Applications	
16. Week	general review	Oral lectures with interactive discussions, Applications	

RESOURCES

Recommended Sources
Selçuk Bayın, "Fen ve Mühendislikte Matematik Yöntemler", METU PRESS.
Bekir Karaoğlu, "Fen ve Mühendislikte Matematik Yöntemler", Seçkin Yayıncılık, 2007
Andrews, G. E. , Askey, R. and Roy, R. "Special functions", Cambridge University Press; New Ed edition, 2001
Bell, W. W. "Special Functions for Scientists and Engineers", Dover Publications, 2004
Temme, N. M. "Special functions. An introduction to the classical functions of mathematical physics", John Wiley & Sons, Inc., New York,
Abramowitz, M. and Stegun, C.A. (Ed.). "Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables", 9th printing, 1972, New York: Dover.

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
1 mid-term exam 1 final exam		
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

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4

PY1	5	5	5	5	5
PY2	5	5	5	5	5
PY3	5	5	5	5	5
PY4	5	5	5	5	5
PY5	5	5	5	5	5
PY6	5	5	5	5	5
PY7	5	5	5	5	5
PY8	5	5	5	5	5
PY9	5	5	5	5	5
PY10	5	5	5	5	5
PY11	5	5	5	5	5
PY12	5	5	5	5	5
PY13	5	5	5	5	5
PY14	5	5	5	5	5
PY15	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

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ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Class Hours (14 weeks)	14	4	56
Final Exam Preparation	1	15	15
Mid Term Exam Preparation	1	15	15
Assignment 1	6	1	6
Assignment 2	6	1	6
Mid Term Exam 1	1	2	2
Final Exam	1	2	2
		Total Workload	102
		Total Workload / 25.5 (s)	4.00
		ECTS Credit of the Course	4