Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Advanced Electromagnetic Theory	FZ-6002		3 + 0	3.0	7.5

Prerequisites	None
Language of Instruction	Turkish
Course Level	Third Cycle
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Prof. Dr. İsmail TARHAN
Instructors	Prof. Dr. İsmail TARHAN
Assistants	
Course Objectives	The main objective of this course is to provide knowledge on Maxwell equations, electromagnetic radiation, scattering and diffraction theory, diffraction radiation, special theory of relativity and the covariant formulation, radiation from moving charges, multiple expansions, radiation reaction.
Course Content	The main topics of the course intent are time-varying fields, Maxwell's equations and macroscopic electromagnetism, Poynting's theorem and conservation of energy and momentum, transformation properties of electromagnetic fields and magnetic monopoles, plane electromagnetic waves and wave propagation, polarization by reflection, group velocity and Kramers-Kronig relations, waveguides, resonant cavities and optical fibers, radiatin systems, multipole fields and radiation, scattering and diffraction of elecromagnetic waves, special theory of relativity, dynamics of relativistic particles and electromagnetic fields, collisions and scattering of charged particles, radiation by moving charges and Bremsstrahlung, radiation damping and classical models of charged particles.
Course Learning Outcomes	1) Explain the origin and propagation of electromagnetic waves with using classical electrodynamics 2) Describe the relativistic effects in electrodynamics, 3) Interpret electric and magnetic field considering the relativity, 4) Evaluate knowledge about basic tools of Electromagnetic theory in order to follow academic research. 5) Analyze electromagnetic wave

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Time-Varying Fields, Maxwell's Equations and Macroscopic Electromagnetism.	Oral lectures with interactive	

Quick Access

Physics (PhD)
- 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

		discussions	
2. Week	Poynting’s Theorem and Conservation of Energy and Momentum	Oral lectures with interactive discussions	
3. Week	Transformation Properties of Electromagnetic Fields and Magnetic Monopoles.	Oral lectures with interactive discussions	
4. Week	Plane Electromagnetic Waves and Wave Propagation	Oral lectures with interactive discussions	
5. Week	Reflection, polarization, group velocity, Kramers-Kronig relation	Oral lectures with interactive discussions	
6. Week	Waveguides, Resonant Cavities and Optical Fibers.	Oral lectures with interactive discussions	
7. Week	Radiatin Systems, Multipole Fields and Radiation.	Oral lectures with interactive discussions	
8. Week	Scattering and Diffraction of Elecromagnetic Waves.	Oral lectures with interactive discussions	
9. Week	Special Theory of Relativity.	Oral lectures with interactive discussions	
10. Week	Special Theory of Relativity.	Oral lectures with interactive discussions	
11. Week	Dynamics of Relativistic Particles and Electromagnetic Fields.	Oral lectures with interactive discussions	
12. Week	Collisions and Scattering of Charged Particles	Oral lectures with interactive discussions	
13. Week	Radiation of moving particle and Bremsstrahlung	Oral lectures with interactive discussions	
14. Week	Radiation Damping and Classical Models of Charged Particles.	Oral lectures with interactive discussions	
15. Week	Review of the semester	Oral lectures with interactive discussions	
16. Week	Final exam	Exam	

RESOURCES

Recommended Sources
Jackson, J. D., "Classical Electrodynamics ", Wiley, 3rd Edition, 1999.

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Ara Sınav + Ödev + Araştırma & Proje ve Sunum 40%, Final Sınavı 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
PY1	5	5	5	5	4	4
PY2	4	4	4	5	4	4
PY3	4	4	5	4	5	3
PY4	4	4	4	4	5	5
PY5	4	4	4	4	4	5
PY6	4	4	4	5	4	5
PY7	4	5	4	4	4	5
PY8	4	4	4	3	4	3
PY9	4	4	5	4	4	5
PY10	4	3	4	4	4	3
PY11	4	4	4	3	4	3
PY12	4	3	4	4	4	3
PY13	4	4	5	4	4	3
PY14	4	3	4	4	4	3
PY15	4	4	3	4	4	3

*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	3	42
Presentation/Seminar	1	10	10
Final Exam Preparation	1	12	12
Research&Project	3	6	18
Assignment 1	3	4	12
Mid Term Exam Preparation	1	8	8
Final Exam	1	3	3

Preliminary Study	14	3	42
Further Study	14	3	42
Mid Term Exam 1	1	3	3
		Total Workload	192
		Total Workload / 25.5 (s)	7.53
		ECTS Credit of the Course	8