



Çanakkale Onsekiz Mart University

Education Information System

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Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Space-Time Geometry And Symmetries I	FZ-6009		3 + 0	3.0	7.5

Prerequisites	None
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Language of Instruction	Turkish
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Course Level	Third Cycle
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Course Type	Elective
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Mode of delivery	Face to face
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Course Coordinator	Assist. Prof. Dr. Melis ULU DOĞRU
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Instructors	Prof. Dr. İhsan YILMAZ Prof. Dr. İsmail TARHAN Assist. Prof. Dr. Melis ULU DOĞRU Assist. Prof. Dr. Sezgin AYGÜN
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Assistants	
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Course Objectives	The course aims to comprehend space-time geometry and symmetries.
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Course Content	Space-time concept and manifold, Lorentz metrics, tensors in manifolds connection and curvature, variation method, topology of space-time, geometry of space-time, formation of symmetry in space-time, symmetry breakings, relation of geometry and symmetry, particle formations, forms of cosmic matter, energy momentum tensors.
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Course Learning Outcomes	1) define the geometry of universe and space-times.
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WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Space-time concept and manifold	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
2. Week	Lorentz metrics	Oral lectures with interactive discussions, Homeworks, Applications,	

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

		Practice Writing the paper and criticism to paper	
3. Week	tensors in manifolds	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
4. Week	connection and curvature	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
5. Week	variation method	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
6. Week	topology of space-time	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
7. Week	Geometry of space-time	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
8. Week	formation of symmetry in space-time	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
9. Week	formation of symmetry in space-time and symmetry breakings	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
10. Week	relation of geometry and symmetry	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
11. Week	symmetry breaking	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the	

		paper and criticism to paper	
12. Week	particle formations	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
13. Week	forms of cosmic matter	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
14. Week	energy meomentum tensors	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
15. Week	general review	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	
16. Week	general review, final exam	Oral lectures with interactive discussions, Homeworks, Applications, Practice Writing the paper and criticism to paper	

RESOURCES

Recommended Sources
Hall, Graham (2004). Symmetries and Curvature Structure in General Relativity (World Scientific Lecture Notes in Physics). Singapore: World Scientific Pub. Co.
Stephani, Hans; Kramer, Dietrich; MacCallum, Malcolm; Hoenselaers, Cornelius & Herlt, Eduard (2003). Exact Solutions of Einstein's Field Equations. Cambridge: Cambridge University Press.

ASSESSMENT

Measurement and Evaluation Methods and Techniques
Quiz, Mid-term exam, Final

COURSE CATEGORY

Course Category	Percentage
Area of?Specialization Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1

<u>PY1</u>	3	3
<u>PY2</u>	4	4
<u>PY3</u>	4	4
<u>PY4</u>	3	3
<u>PY5</u>	4	4
<u>PY6</u>	5	5
<u>PY7</u>	4	4
<u>PY8</u>	4	4
<u>PY9</u>	4	4
<u>PY10</u>	4	4
<u>PY11</u>	2	2
<u>PY12</u>	4	4
<u>PY13</u>	3	3
<u>PY14</u>	5	5
<u>PY15</u>	5	5

*DK = Course's Contribution.

	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)
Final Exam	1	3	3
Research&Project	6	15	90
Final Exam Preparation	1	25	25
Mid Term Exam Preparation	1	25	25
Mid Term Exam 1	1	3	3
Class Hours (14 weeks)	14	3	42
Quiz 1	4	1	4
Total Workload			192
Total Workload / 25.5 (s)			7.53
ECTS Credit of the Course			8