Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Fundamental High Energy Astrophysics	FZK376	6. Semester	2 + 2	3.0	7.0

Prerequisites	None

Language of Instruction	English
Course Level	Bacheclor's Degree (First Cycle)
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Gülnur GÜN
Instructors	
Assistants	
Course Objectives	This course is an introduction to high energy astrophysics. The aim of the course is to give the knowledge about cosmic particles, gamma rays, neutrinos, the radio waves etc and the celestial objects which radiates in these types of spectrum.
Course Content	What is high energy astrophysics?, The cosmic rays- I, The cosmic rays – II, The cosmic rays – III, Ultraviolet radiation, The celestial objects that are emitted UV and their properties. ,X-ray radiation- I, Midterm Exam, The celestial objects that are emitted X-ray radiation and their properties., Gamma ray radiation, The celestial objects that are emitted Gamma ray radiation and their properties.The neutrinos –I, The neutrinos –II, Radio waves, The celestial objects that are emitted radio waves and their properties. Final Exam
Course Learning Outcomes	1) Answer the question what the high energy astrophysics is 2) Analyse the cosmic rays, neutrinos and their relations. 3) Explain the ultraviolet radiation, X-rays, gamma rays and the objects emit these radiations in universe 4) Compare the ultraviolet radiation, X-rays, gamma rays and the objects emit these radiations in universe. 5) Explain what Ultraviolet radiation, X-rays, Gamma rays and radio waves are

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	What is high energy astrophysics?	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	

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

2. Week	The cosmic rays- I	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
3. Week	The cosmic rays – II	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
4. Week	The cosmic rays – III	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
5. Week	Ultraviolet radiation	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
6. Week	The celestial objects that are emitted UV and their properties.	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
7. Week	X-ray radiation- I	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
8. Week	Midterm Exam	(Written or test exam) Lecture	
9. Week	The celestial objects that are emitted X-ray radiation and their properties	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
10. Week	Gamma ray radiation	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
11. Week	The celestial objects that are emitted Gamma ray radiation and their properties.	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
12. Week	The neutrinos –I	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
13. Week	The neutrinos –II	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
14. Week	Radio waves	(Face to face	

		lecture and the relevant part of the course materials is studied by the students)Lecture	
15. Week	The celestial objects that are emitted radio waves and their properties.	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
16. Week	Final Exam	(written exam) Lecture	

RESOURCES

Recommended Sources
Longair, M.S.:1992, High Energy Astrophysics, Second Edition, Volume 1, Cambridge University Press.
Weekes, T.C. : 1980, High Energy Astrophysics, Chapman and Hall Limited.
Editors : Fabian, A.C., Pounds, K.A., and Blandford, R.D. : 2004, Frontiers of X-Ray Astronomy, Cambridge University Press.
Editors : Lehy, D.A., Hicks, R.B., and Venkatesan, D. : 1994, Proceedings of the XXIII International Cosmic Ray Conference, World Scientific Publishing Co. Pte.Ltd
Cordova, F.A. : 1988, Multiwavelength Astrophysics, Cambridge University Press.

ASSESSMENT

Measurement and Evaluation Methods and Techniques
Midterm exam (40 %), Final exam (60 %)

COURSE CATEGORY

Course Category	Percentage
Area of Specialization Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
PY1	3	3	3	3	3	3
PY2	4	4	4	4	4	4
PY3	5	5	5	5	5	4
PY4	1	1	1	1	1	1
PY5	3	3	3	3	3	3
PY6	5	5	5	5	5	5
PY7	1	1	1	1	1	1
PY8	4	5	0	5	5	5
PY9	5	5	5	5	5	5
PY10	5	5	5	5	5	5
PY11	3	3	3	3	3	3
PY12	3	3	3	3	3	3
PY13	4	4	4	4	4	4
PY14	2	2	2	2	2	2

PY15	1	1	1	1	1	1

*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	14.5	14.5
Mid Term Exam Preparation	1	7	7
Further Study	14	2	28
Final Exam	1	2	2
Mid Term Exam 1	1	1	1
Lecture	14	4	56
Preliminary Study	14	1	14
		Total Workload	178.5
		Total Workload / 25.5 (s)	7.00
		ECTS Credit of the Course	7