Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
X-Ray Astronomy II	FZ5050		3 + 0	3.0	7.5

Prerequisites	None
Language of Instruction	English
Course Level	Second Cycle
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Gülnur GÜN
Instructors	Assist. Prof. Dr. Gülnur GÜN
Assistants	
Course Objectives	The objective of this course is to give knowledge and skill about the X ray satellites, the dedectors in X ray astronomy, the data analysis methods of different satellites and X ray background.
Course Content	Observational techniques in X-ray astronomy, X-ray background, Proportional counters, Microchannel plates, Semiconductor dedectors, Scintillatiors, phosphors and NEADs, Single photon calorimeters, X-ray data analysis techniques, ROSAT X-ray satellite data analysis techniques, Chandra X-ray satellite data analysis techniques, XMM-Newton X-ray satellite data analysis techniques, Suzaku X-ray satellite data analysis techniques.
Course Learning Outcomes	1) Describe simply the internal structures of satellites that observe X-rays. 2) Explain simply the dedectors used in X-ray satellites 3) Recognize an astronomical object which is observed in X-rays and its background in a X-ray image of a satellite 4) Take the knowledges about the observations from web pages of X-ray satellites such as ROSAT,Chandra,XMM-Newton and Suzaku 5) Download the data analysis programmes of ROSAT,Chandra,XMM-Newton and Suzaku X-ray satellites . 6) Analyse basically the data of X-ray satellites such as ROSAT,Chandra, XMM-Newton and Suzaku.

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Observation techniques in X-ray astronomy -I	(Face to face lecture and the relevant part of the course materials is studied by the	

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

		students)Lecture	
2. Week	Observational techniques in X-ray astronomy - II	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
3. Week	X-ray background	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
4. Week	Proportional counters	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
5. Week	Microchannel plates	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
6. Week	Semiconductor dedectors	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
7. Week	Scintillatiors, phosphors and NEADs	(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	Single photon calorimeters	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
10. Week	X-ray data analysis techniques - I	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
11. Week	X-ray data analysis techniques - II	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
12. Week	ROSAT X- ışın uydusu veri analiz teknikleri	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
13. Week	Chandra X-ray satellite data analysis techniques	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	

14. Week	XMM-Newton X-ray satellite data analysis techniques	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
15. Week	Suzaku X-ray satellite data analysis techniques	(Face to face lecture and the relevant part of the course materials is studied by the students)Lecture	
16. Week	Final exam	(Written or test exam) Lecture	

RESOURCES

Recommended Sources
Editors : Fabian, A.C., Pounds, K.A., and Blandford, R.D. : 2004, Frontiers of X-Ray Astronomy, Cambridge University Press.
Editors : Trümper, J.E., Hasinger, G.,2008, The Universe in X Rays, Springer Astronomy and Astrophysics Library
Fraser, G.W., 1989,X-Ray Dedectors, Cambridge University Pres.
Web pages of several X-ray satellites

ASSESSMENT

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

COURSE CATEGORY

Course Category	Percentage
Area of pecialization Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5	DK6
PY1	2	2	2	2	2	2	2
PY2	5	5	5	5	5	5	5
PY3	5	5	5	5	5	5	5
PY4	5	5	5	5	5	5	5
PY5	3	3	3	3	3	3	3
PY6	5	5	5	5	5	5	5
PY7	4	4	4	4	4	4	4
PY8	5	5	5	5	5	5	5
PY9	5	5	5	5	5	5	5
PY10	5	5	5	5	5	5	5
PY11	5	5	5	5	5	5	5
PY12	5	5	5	5	5	5	5
PY13	5	5	5	5	5	5	5
PY14	4	4	4	4	4	4	4
PY15	5	5	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

.

ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Class Hours (14 weeks)	14	3	42
Final Exam Preparation	1	17.25	17.25
Final Exam	1	2	2
Mid Term Exam Preparation	1	10	10
Mid Term Exam 1	1	1	1
Lecture	14	3	42
Further Study	14	4	56
Preliminary Study	14	1.5	21
		Total Workload	191.25
		Total Workload / 25.5 (s)	7.50
		ECTS Credit of the Course	8