Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Advanced Astrophysics II	FZ-6024		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. Ahmet ERDEM
Instructors	Prof. Dr. Caner ÇİÇEK
Assistants	
Course Objectives	In this course, star formation, stellar evolution and the physics of stellar interiors will be discussed. The main topics to be covered in this course include; star formation and its evolution, the physics of stellar interior and the equations of stellar structure, absorption events, stellar atmospheres, convective envelopes, stellar winds, thermonuclear reactions and nucleosynthesis, weak interactions in stellar interiors, stellar stability and hydrodynamics, stellar magnetic fields, white dwarfs, novae, supernovae, neutron stars and black holes.
Course Content	Star Formation and Stellar Evolution, The Physics of Stellar Interiors and The Equations of Stellar Structure, Absorption Processes, Stellar Atmospheres, Convective Envelopes, Stellar Wİnds, Thermonuclear Reactions and Nucleosynthesis, Weak Interactions in Stellar Interiors, Stellar Stability and Hydrodynamics, Stellar Magnetic Fields, White Dwarfs, Novae and Supernovae, Neutron Stars, Black Holes.
Course Learning Outcomes	1) Be able to learn the formation and the evolutionary state of stars 2) Be able to obtain required structure equations for learning the stellar interiors 3) Be able to learn the structure of stellar atmospehere 4) Be able to learn the structure of the white dwarfs 5) Be able to learn the structure of novae and supernovae 6) Be able to learn the structure of neutron stars and black holes

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Star Formation and Stellar Evolution	Lecture, Homework, Read Scientific Papers, Discussion	

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

2. Week	The Physics of Stellar Interiors and The Equations of Stellar Structure	Lecture, Homework, Read Scientific Papers, Discussion	
3. Week	Absorption Processes	Lecture, Homework, Read Scientific Papers, Discussion	
4. Week	Stellar Atmospheres	Lecture, Homework, Read Scientific Papers, Discussion	
5. Week	Convective Envelopes	Lecture, Homework, Read Scientific Papers, Discussion	
6. Week	Stellar WİInds	Lecture, Homework, Read Scientific Papers, Discussion	
7. Week	Thermonuclear Reactions and Nucleosynthesis	Lecture, Homework, Read Scientific Papers, Discussion	
8. Week	Weak Interactions in Stellar Interiors	Lecture, Homework, Read Scientific Papers, Discussion	
9. Week	Midterm Exam	Exam	
10. Week	Stellar Stability and Hydrodynamics	Lecture, Homework, Read Scientific Papers, Discussion	
11. Week	Stellar Magnetic Fields	Lecture, Homework, Read Scientific Papers, Discussion	
12. Week	White Dwarfs	Lecture, Homework, Read Scientific Papers, Discussion	
13. Week	Novae and Supernovae	Lecture, Homework, Read Scientific Papers, Discussion	
14. Week	Neutron Stars	Lecture, Homework, Read Scientific Papers, Discussion	
15. Week	Final exam	Written exam	
16. Week	Final Exam	Written exam	

RESOURCES

Recommended Sources
“Stellar Astrophysics” ,Vitense, Böhm E., Volumes 1-2-3, 1989
“Advanced Astrophysics”, Neb Duric, Cambridge University Press. 2004
“Stellar Interiors, Physical Principles, Structure, and Evolution, Series”: Astronomy and Astrophysics Library, Hansen, Carl J., Kawaler, Steven D., Trimble, Virginia, 2nd ed., 2004

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Midterm exam, Discussion, Question-Answer, 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

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	DK6
PY1	4	4	4	4	4	4	4
PY2	4	4	4	4	4	4	4
PY3	4	4	4	4	4	4	4
PY4	3	3	3	3	3	3	3
PY5	3	3	3	3	3	3	3
PY6	3	3	3	3	3	3	3
PY7	4	4	4	4	4	4	4
PY8	3	3	3	3	3	3	3
PY9	3	3	3	3	3	3	3
PY10	3	3	3	3	3	3	3
PY11	3	3	3	3	3	3	3
PY12	3	3	3	3	3	3	3
PY13	3	3	3	3	3	3	3
PY14	3	3	3	3	3	3	3
PY15	3	3	3	3	3	3	3

*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	10	10
Mid Term Exam Preparation	1	10	10
Case Study	4	6	24
Assignment 1	10	6	60
Final Exam	1	2	2
Mid Term Exam 1	1	2	2
Reading	14	3	42
		Total Workload	192
		Total Workload / 25.5 (s)	7.53
		ECTS Credit of the Course	8