

T-104 2022

# **Course Specification**

Course Title: Astrophysics 2
Course Code: PHYS 412
Program: B.Sc. in Physics
Department: Department of Physics and astronomy
College: College of Science
Institution: King Saud University
Version: 2.0.0
Last Revision Date: Feb. 2024





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A. General information about the course:						
Co	ourse Identificati	on				
1.	Credit hours:	2(2+0+0)				
2.	Course type					
a.	University 🗆	College 🗆	Dep	partment⊠	Track	Others□
b.	Required	Elective⊠				
3. off	Level/year at where	nich this course	is	$8^{th}$ level / $4^{th}$ year		
<b>4. Course general Description</b> The course aims to introduce students to the main properties of Galaxies (types and properties) as well as to the basic concepts of large-scale universe. The main topics are: Interstellar matter (ISM): distribution and structure- Physics of ISM- HI and HII regions - Interstellar clouds -Star Formation-Galaxies: characteristics, types, chemical properties and evolution-Planetary nebulae.						
5. Pre-requirements for this course (if any): 102 Astro						
6. Co- requirements for this course (if any):						
<ul> <li>7. Course Main Objective(s)</li> <li>1. Advance in some fundamentals in Astronomy and Astrophysics at large-scale.</li> <li>2. Get familiarize with some basic concepts of Interstellar matter (ISM) and Galaxies.</li> </ul>						

- Applying physical laws and principles to interpret the main properties of the ISM and Galaxies.
- 4. Using Astrophysical concepts and related analysis approaches to improve the generic skills such as: knowledge interpersonal communication problem solving IT.

#### 1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100%
2.	E-learning	0	0
3.	<ul><li>Hybrid</li><li>Traditional classroom</li><li>E-learning</li></ul>	0	0
4.	Distance learning	0	0





No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
	Total	30

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Knowing the main observational properties of ISM and Galaxies	K1	• Give extensive examples during lectures.	• Hold Class discussion, tutorial sessions.
1.2	Knowing the basic physical concepts of star-forming regions, Galaxies and planetary nebulae.	K2	• Give problem sheets to be discussed during lectures.	• Give quizzes, mid-term exam and final exam.
2.0	Skills			
2.1	The ability to manipulate physical equations and formulae related to basic galactic Astrophysics.	S1	<ul> <li>Give extensive examples during lecture</li> <li>Give problem sheets to be discussed</li> </ul>	<ul> <li>Hold Class discussion, tutorial sessions.</li> <li>Give</li> </ul>
2.2	The ability to describe and understand some	S2	<ul><li>during lectures.</li><li>assignments.</li><li>Discussions in the classes</li></ul>	quizzes, mid-term exam and final exam.





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, ar	nd responsibility		
3.1	Work independently and as a team- Computations and data analysis-Manage resources and time- Communicate results of the work to others- Report writing	<b>V</b> 1	<ul> <li>Assignments.</li> <li>Homeworks</li> <li>Data analysis and interpretation.</li> </ul>	Hold Class discussions

## C. Course Content

No	List of Topics	Contact Hours
1.	ISM: introduction- distribution, structure and the main physics	4
2.	HI and HII regions, Interstellar clouds	6
3.	Star formatting regions	8
4.	Galaxies: types, general properties and basic physics	6
4.	Physics and chemistry of Planetary nebulae	6
	Total	

## **D. Students Assessment Activities**

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class activities: HWs and tasks, reports, presentations.	Weekly	20%
2.	Mid-exam I	Approx. 6	20%
3.	Mid-exam II	Approx. 12	20%
4.	Final examination	From 16 to 18	40%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	<ul> <li>An introduction to modern Astrophysics Authors: Bradley Carroll and Dale Ostlie, Addison Wesley Publisher: Pearson; 2 edition (July 28, 2006)</li> <li>Introduction to Astronomy (in Arabic) –Galaxies Part Authors: M. Nawawy, A. Kordi and H. Al-Trabulsy King Saud University Publisher, 2011</li> <li>Astrophysics 2: ISM and Galaxies Authors: Richard L. Bowers, Terry Deeming Publisher: Jones and Bartlett Publishers, 1984 Digitized: 8Feb. 2010</li> </ul>
Supportive References	<ul> <li>Astronomy Today, eds. E. Chaisson and S McMillan, Publisher: Pearson; 8 edition (17 Sep 2014)</li> <li>Astronomy: The evolving Universe, M Zeilik, Jhon Wiley and sons, Inc.</li> </ul>
Electronic Materials	Galaxies-ISM web sites of interest, provided by the instructor
Other Learning Materials	Multi media materials accompanying the text books and the relevant websites (provided by the instructor, when needed)

#### 2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom which accommodates 25 students. (make use of the facilities at the Astronomy Unit, when needed)
Technology equipment (projector, smart board, software)	Whiteboard and Smart board
Other equipment (depending on the nature of the specialty)	Not applicable

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students\ Peer Reviewer	Indirect \ direct
Effectiveness of students assessment	Students- Faculty	Direct
Quality of learning resources	students	Indirect
The extent to which CLOs have been achieved	Faculty	Indirect
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)





G. Specification Approval Data	
COUNCIL /COMMITTEE	Physics Department's council
REFERENCE NO.	17 <sup>th</sup> (2 <sup>nd</sup> term /1445)
DATE	16/10/1445 H

