



Physics Department 14 Birzeit - ☎02-2982149/2982003 ☎02- 2982084

PHYS233: Astronomy

Course Outline

Spring 2020-2021

Instructor: Dr. Wafaa Khater

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Textbook: *Fundamental Astronomy*, Karttunen, H., Kröger, P., Oja, H., Poutanen, M., Donner, K.J. (Eds.)

Online teaching via: <https://itc.birzeit.edu/>

Course Prerequisites: Phys141

Course Description:

Physics 233 is an introductory course in classical and modern astronomy and astrophysics. The course provides a qualitative and quantitative introduction to the physics of the solar system, stars, interstellar medium, galaxies, and the universe.

Grade Distribution:

Quizzes, Homework	15%
Presentation	15%
Midterm Exam	30%
Final Exam	40%
Total	100%

Stargazing at BZU: The BZU Observatory (Michel and Saniah Hakim Observatory) provides opportunity for viewing the night sky from campus. You are advised to participate in the events and may join the BZU astronomy club.

Course Syllabus:

Week	Topic	Chapter
Week 1	Role of Astronomy Astronomical Objects, The scale of the Universe	1: Introduction
Week 2	Spherical Trigonometry, The Earth, The Celestial Sphere, The Horizontal System,	2: Spherical Astronomy
Week 3	The Equatorial System, Rising and Setting Times, The Ecliptic System, The Galactic Coordinates, Perturbations of Coordinates,	
Week 4	Positional Astronomy, Constellations, Star Catalogues and Maps, Sidereal and Solar Time,	

	Astronomical Time System, Calendars, Examples.	
Week 5	Observing Through the Atmosphere, Optical Telescopes, Detectors and Instruments,	3: Observation and Instruments
Week 6	Radio Telescopes, Other Wavelength Regions, Other Forms of Energy, Examples.	
Week 7	Equations of Motion, Solutions of the Equation of Motion, Equation of the Orbit, and Kepler's First Law, Orbital Elements,	6: Celestial Mechanics
Week 8	Kepler's Second and Third Laws, Systems of Several Bodies, Orbit Determination,	
Week 9	Position in the Orbit, Escape Velocity, Virial Theorem, The Jeans Limit, Examples.	
Midterm Exam		
Week 10	Planetary Configurations, Orbit of the Earth and Visibility of the Sun, The Orbit of the Moon, Eclipses and Occultation, The Structure and Surfaces of Planets, Atmospheres and Magnetospheres, Albedos, Photometry, Polarimetry and Spectroscopy, Thermal Radiation of the Planets, Mercury, Venus, The Earth and the Moon, Mars, Jupiter, Saturn, Uranus and Neptune, Minor Bodies of the Solar System, Origin of the Solar System, Examples.	7: The Solar System
Week 11		
Week 12		
Week 13	Internal Equilibrium Conditions, Physical State of the Gas, Stellar Energy Sources, Stellar Models, Examples.	10: Stellar Structures
Week 14	Evolutionary Time Scales, The Contraction of Stars Towards the Main Sequence, The Main Sequence Phase, The Giant Phase, The Final Stages of Evolution, Comparison with Observations, The Origin of the Elements, Examples.	11: Stellar Evolution
Week 15	Internal Structure, The Atmosphere, Solar Activity, Example.	12: The Sun