



University of Science and Technology of Hanoi  
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### COURSE SYLLABUS

**Subject:** Introduction to Astronomy

**Academic field:** Astronomy

**Lecturer:**

**Assoc. Prof. Nguyen Quynh Lan**

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**Academic year:** 2013-2014

### COURSE DESCRIPTION

<b>Credit points</b>	3 hours credit	
<b>Level</b>	Undergraduate	
<b>Teaching time Location</b>	University of Science and Technology of Hanoi	
<b>Time Commitment</b>	Lecture	30hrs
	Exercises	10hrs
	Practical	5hrs
	Total	45hrs
<b>Prerequisites</b>	few basic results from classical Mechanics, Electricity and magnetism, optic, Theoretical Mechanics.	
<b>Recommended background knowledge</b>		
<b>Subject description:</b>	Introduction to Astronomy provides a quantitative introduction to the physics of the solar system, stars, the interstellar medium, the galaxy, and the universe, as determined from a variety of astronomical observations and models.	
<b>Objectives &amp; Out-come</b>	<p>(Knowledge &amp;/ Skills gained via the course)</p> <p>The goals of this course are:</p> <ul style="list-style-type: none"> <li>- To understand science as a process: how it is done, what skills are involved, how it applies to everyday life, and how it is used to learn about the universe</li> <li>- To understand and apply basics physics concepts to problems in astronomy</li> <li>- To provide a basic knowledge of the Universe outside the Solar System, sufficient to prepare students for more advanced astronomy courses.</li> </ul>	
<b>Assessment/ Evaluation</b>	Attendance/Attitude	%
	Exercise(s)	10%
	Practicals	10%
	Mid-term test	30%
	Final exam	50%
<b>Prescribed Textbook(s)</b>	[1]FundamentalAstronomy, HannuKarttunen et al. Springer Verlag Berlin Heidelberg New York, ISBN 3-540-600936-9	



	[2] Introduction to Modern Astrophysics ; Bradley W. Carroll and Dale A. Ostlie; ISBN-13: 978-0805304022
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### COURSE CONTENTS & SCHEDULE

Class	Contents	Hours			Ref./Resources	Assignment(s)
		Lect.	Exr.	Prc.		
Chapter 1: Introduction	[1] Topic 1: Our place in the universe: - Scale of the universe, modern view of the universe - Astronomical definitions, objects. [2] Topic 2: History of astronomy and the science of astronomy - Ancient Greek Astronomy - Copernican Revolution [3] Topic 3: The origin of modern astronomy: - Newton's Laws - Kepler's Laws	3	1	1		
Chapter 2: Spherical Astronomy	[1] Topic 1: The Celestial Sphere: - Spherical Trigonometry - The Celestial coordinators [2] Topic: - The Earth - Seasons - Sidereal and Solar Time. - Eclipse and Tidal - Calendar	3	1	1		
Chapter 3: Observations and Instruments	[1] Topic 1: Introduction to Electromagnetic Waves; Doppler Effect [2] Topic 2: Detector and instruments [3] Topic 3: Optical, Radio, and X-Ray	3	1	2		

	Telescopes					
Chapter 4: Photometric concepts and magnitudes	[1] Topic 1: Intensity, Flux Density and Luminosity [2] Topic 2: Distances and Magnitudes - Apparent magnitudes - Magnitude system - Absolute magnitude	4	1			
Chapter 5: Radiation Mechanisms	[1] Topic 1: Light and Matter - Properties of light(telescopes, spectroscopy) - Interactions with matter - Spectral analysis of stars and planets (Doppler Shift) [2] Topic 2: Universe of matter and energy	3	2			
Chapter 6: Celestial Mechanics		3	1			
Chapter 7: Earth and the solar system	[1] Topic 1: Formation of the Solar System [2] Topic 2: The terrestrial planets [3] Topic 3: Jovian planets [4] Topic 4: Our Earth(a detailed analysis) [5] Topic 5: Our star, Sun	3	1	1		
Chapter 8: Stars	[1] Topic: Surveying the stars - Hertzsprung-Russell Diagrams - Hydrostatic Equilibrium - Stellar Structure and Evolution - Nuclear Reactions in Stars [2] Topic: Star birth evolution and death (White Dwarfs, Neutron Stars, Black Holes) [3] Topic 3: Star Formation; Virial Theorem	4	1			



Chapter 9: Galaxies and Cosmology	[1] Topic 1: Our Galaxy [2] Topic 2: Masses of Galaxies and Galaxy Clusters; Distance Ladder [3] Topic 3: Age and Large Scale Structure of the Universe; Intergalactic Medium [4] Topic 4: Active Galactic Nuclei [5] Topic 5: Cosmology - Newtonian Cosmology - Thermal History of the Universe	4	1					
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Notes:

- Abbreviation: Lect. (lecture), Exr. (Exercise), Prc. (Practise).
- Exercises may include assignment, reports, student's presentation, homework, class exercises ...for each class sessions
- Practicals mostly refer to Lab- work or outside practice such as field trip.

**Reference Literature:**

[1].Zeilik, Michael, and Stephen A. Gregory. Introductory Astronomy and Astrophysics. 4th ed. Fort Worth, TX: Saunders College Publishing, 1997. ISBN: 9780030062285.
[2]. Astronomy: From the Earth to the Universe, Jay Pasachoff, Sauders College Publishing, 1995
[3].An Introduction To Modern Cosmology, Andrew Liddle, John Wiley & Son Ltd, 2003
[4]. Advanced Astrophysics, Neb Duric, Cambridge University Press, 2004