

**34. Space Environment (PH037IU)**

Module designation	<i>This is an introductory course of physical properties of plasma; the solar atmosphere; the solar dynamo; the magnetic field and the ionosphere of the Earth; the interaction between the solar wind and the magnetic field of the Earth; the impact of the ionosphere on satellite communication.</i>
Semester(s) in which the module is taught	1, 2
Person responsible for the module	Assoc. Prof. Phan Bảo Ngọc
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, practice
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 37.5 Private study including examination preparation, specified in hours: 90
Credit points/ECTS	3 credits/4.62 ECTS
Required and recommended prerequisites for joining the module	Parallel Course: General Physics 2 (PH014IU) (or Physics 3 (PH015IU))



Module objectives/intended learning outcomes	Upon the successful completion of this course students will be able to:	
	<b>Competency level</b>	<b>Course learning outcome (CLO)</b>
	Knowledge	CLO1: Demonstrate fundamental concepts of plasma, solar physics such as solar atmosphere, solar activities, and solar dynamo, geomagnetism and Earth's ionosphere.
	Skill	CLO2: Explain the physical processes in space such as the interaction between the solar wind and Earth's magnetic fields.
	Attitude	CLO3: Identify the impact of space environment on satellite communication, emerging space technologies, and on solutions to typical problems in space engineering.



Content	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
	<b>Topic</b>	<b>Weight</b>	<b>Level</b>
	Part A: Atmospheric structure and physical processes in some regions of space Chapter 1: Plasma Physics	2	I, T
	Chapter 2: Solar physics	3	I, T
	Chapter 3: Solar Wind	3	I, T
	Chapter 4: Geomagnetism	2	I, T
	Chapter 5: Magnetosphere	2	I, T
	Chapter 6: Neutral Atmosphere	2	I, T
	Chapter 7: Ionosphere	1	T, U
Examination forms	Exam		
Study and examination requirements	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>		



Reading list	<p><b>Textbooks:</b></p> <p>[1] Tamas I. Gombosi, <i>Physics of the Space Environment (Cambridge Atmospheric and Space Science Series)</i>, Cambridge University Press; Revised ed. edition (2004)</p> <p><b>References:</b></p> <p>[2] Francis F. Chen, <i>Introduction to Plasma Physics and controlled fusion</i>, second edition (1974)</p> <p>[3] Davies, Kenneth. <i>Ionospheric radio</i>. No. 31. IET (1990)</p> <p>[4] Hargreaves, John Keith. <i>The solar-terrestrial environment: an introduction to Geospace-the science of the terrestrial upper atmosphere, ionosphere, and magnetosphere</i>. Cambridge university press (1992)</p>
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