



## 28. Earth Observation and the Environment (PH027IU)

Module designation	<i>This course gives students an understanding of the Earth's climate system, an appreciation of the environmental issues (water pollution, air pollution, soil pollution, etc), and also sheds light on the role of Earth's climate system, which may have on the space systems, especially the negative impacts. Some engineering approaches are suggested to suppress these negative impacts in maintaining the lifetime of the space systems in their services.</i>
Semester(s) in which the module is taught	1
Person responsible for the module	Assoc. Prof. Hồ Quốc Bằng
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project
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	None



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. Describe components of the Earth's climate system and its impacts on environmental issues.
	Skill	CLO2. Explain environmental issues using the Earth's observations.
Attitude	CLO3. Identify the impact of the Earth's climate change and observation techniques on society and environmental issues.	
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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>
	Chapter 1: Introduction Overview of the environment Importance of environment for quality of life Importance of Earth observation to solve environmental issues	2	I, T
	Chapter 2: Earth's environment Description Earth's environment as a system Identification of the key environment system components and their characteristics and interactions	3	I, T
	Chapter 3: Key environmental issues relevant to Earth observation Local (pollution), regional (acid rain), and global (ozone depletion, climate change)	2	I, T
	Chapter 4: Earth observation techniques Methods of measuring key geophysical parameters (PM <sub>2.5</sub> , weather, etc) by satellite	3	I, T
	Chapter 5: Applications of Earth observation Overview of different sectors (agriculture, etc.)	2	I, T
	Chapter 6: Climate change Science, impacts and policy	3	I, T
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] <i>Satellite Technology, Principles and Technology</i>, Anil K. Maini &amp; Varsha A., Wiley, 2011.</p> <p>[2] <i>Remote sensing: Principles and Applications</i>, Floyd F. Sabins, Waveland Press, Inc. (1997)</p> <p><b>References:</b></p> <p>[3] Quoc Bang Ho. 2016. <i>Urban Air Pollution: from theory to practice</i>. 420 pages. NXB ĐHQG Tp.HCM, 2016</p> <p>[4] Quoc Bang Ho. 2016. <i>Climate change and response measures</i> 520 pages. VNU HCM Presse, 2016</p> <p>[5] Quoc Bang Ho, Hoang Ngoc Khue Vu, Thoai Tam Nguyen, Thi Thuy Hang Nguyen, Nguyen Thi Thu Thuy. 2019. <i>A combination of bottom-up and top-down approaches for calculating air emission for developing countries: A case of Ho Chi Minh city, Vietnam. Air Quality, Atmosphere &amp; Health</i> volume 12, pages 1059–1072(2019).</p>