CORE COURSES

27. Introduction to Space Engineering (PH018IU)

Module designation	*This introductory course will bring a general overview of Space Science and Engineering to students, including the background of space and solar physics and the historical development of Space Engineering throughout the XX century. Since the course is designed from the engineers' point of view, prospective students with strong interests in Space Science and Engineering will be provided with solid foundations of the field, as well as the finest motivations for the needs of Vietnam for space science, space technology and applications in the XXI century.*
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
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 25 Private study including examination preparation, specified in hours: 60
Credit points/ECTS	2 credits/3.08 ECTS
Required and recommended prerequisites for joining the module	None

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Describe basic concepts and roles of Space Science and Engineering in the era of Space Exploration.</td></tr>
<tr><td>Skill</td><td>CLO2. Express ideas by using the appropriate means of graphical communications or oral presentations.</td></tr>
<tr><td>Attitude</td><td>CLO3. Recognize the need of further self-learning in Space Science and Engineering.</td></tr>
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<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction and History</td><td>1</td><td>I, T</td></tr>
<tr><td>Part 1: Space Science
Chapter 1: Orbital Mechanics</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 2: Planetary Science</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 3: Space Physics</td><td>3</td><td>I, T</td></tr>
<tr><td>Part 2: Satellite Technology
Chapter 4: Introduction to Satellites and their Applications</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 5: Remote Sensing</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 6: Navigation Systems</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 7: Space Telescopes</td><td>1</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Exam</td></tr>
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Study and examination requirements	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. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**Textbooks:** [1] *Tools of Radio Astronomy,* T. L. Wilson, K. Rohlfs. Huttemeister, 5th Edition, Springer [2] Anil K. Maini & VarshaAgrawal (2011). *Satellite Technology Principles and Applications,* A John Wiley and Sons, Ltd., Publication. **References:** [3] *Galactic Astronomy (Princeton Series in Astrophysics)*, James Binney and Michael Merrifield, Princeton University Press [4] *Galactic Dynamics*, James Binney and Scott Tremaine, Princeton University Press [5] *Remote Sensing and Image Interpretation*, Thomas M. Lillesand and Ralph W. Kiefer, Wiley.