



This biannual learning is being organized in 2023-2024

Teacher(s)	Dehant Véronique (coordinator) ;Le Maistre Sébastien ;Rekier Jérémy ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Basic training in physics and mathematics (level of bachelor in sciences or applied sciences). Having followed LPHYS2161 is an asset.
Main themes	The topics/themes covered in the teaching unit are space geodesy for the Earth and planets with a particular focus on the Global Navigation Satellite System (GNSS) and their applications in geophysics.
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>a. Contribution of the teaching unit to the learning outcomes of the programme (PHYS2M and PHYS2M1) AA1: A1.1, A1.2, A1.3, A1.4, A1.5, A1.6 AA2: A2.1, A2.2 AA3: A3.1, A3.2, A3.4 AA6: A6.1 AA7: A7.3 AA8: A8.1, A8.2</p> <p>b. Specific learning outcomes of the teaching unit</p> <p>1 At the end of this teaching unit, the student will be able to :</p> <ol style="list-style-type: none"> 1. explain space geodesy techniques used on Earth ; 2. properly apply spatial geodesy methods to retrieve terrestrial geophysical information ; 3. define terrestrial and celestial reference systems and passages from one to the other ; 4. explain the geophysical phenomena that disturb the rotation and orientation of the Earth ; 5. explain spatial geodesic techniques used around planets and moons of the solar system ; 6. properly apply spatial geodesy methods to retrieve the geophysical information that can be obtained for the planets and moons of the solar system on their current, past and future states and their evolutions ; 7. access the databases of space geodesy ; 8. use multidisciplinary approaches to solve a spatial geodesy problem or a fundamental question such as the habitability of the planets and moons of the solar system or exoplanets.
Evaluation methods	Individual oral exam with two presentations of questions to choose from the course. Individual work on GNSS data.
Teaching methods	Lectures and exercises, with a visit of a geodesic site and of the Royal Observatory of Belgium
Content	<ol style="list-style-type: none"> 1. Classical and spatial geodesy 2. GPS system 3. European Galileo System and other satellite navigation systems 4. GPS / GNSS applications in Earth sciences 5. Celestial reference systems and frames 6. Terrestrial reference systems and frames 7. Rotation of the Earth 8. Space geodesy techniques other than GNSS 9. Space geodesy around other planets of the solar system 10. Motion of an artificial satellite around a planet and geophysical information
Bibliography	

Other infos	
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Geography : Climatology	CLIM2M	5		
Master [60] in Physics	PHYS2M1	5		
Master [120] in Physics	PHYS2M	5		