Academic course description – PLANETARY GEOLOGY

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| bachelor’s DEGREE**Geochemistry** 3rd YEAR OF STUDY, 1st SEMESTER |

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| **Course title** | **Plentary geology**  |
| Course code | 31020030020SL1222228  |
| Course type | full attendance |
| Course level | 1st cycle (bachelor’s degree) |
| Year of study, semester | 3rd year of study, 1st semester |
| Number of ECTS credits | 5 |
| Number of hours per week | 4 (2 lecture hours + 2 seminar hours) |
| Name of lecture holder | Professor Ovidiu Gabriel Iancu  |
| Name of seminar holder | Assistant Lecturer Iuliana Buliga  |
| Prerequisites | Geophysics  |
| A | **General and course-specific competences** |
|  | **General competences**:* Developing students’ interest for independent research and their participation in scientific events
* Teaching the necessary steps in the complete analysis of meteorites

**Course-specific competences**:* The application of theoretical and experimental models regarding geological processes, as well knowledge from related fields, for the understanding of the phenomena occurring on the planets of the Solar System and their satellites
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| B | **Learning outcomes** |
|  | * Students accumulate knowledge on the main geological processes taking place within the Solar System, as well as the geological and geochemical particularities of terrestrial planets and satellites
* Students become capable of assessing meteorites both macroscopically and microscopically, as well as classifying them based on analyses of major and trace elements
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| C | **Lecture content** |
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| Week | Title of lecture | Teaching methods |  Duration  |
| 1 | Definitions, history, conceptions regarding the position of the planets in the Universe, the evolution of the Universe, space missions with/without human crew  |  Lecture based on video projection  | 2 hours |
| 2 | The Sun: composition, location, size, nuclear fusion, radiative zone, convection zone, photosphere, chromosphere, corona, solar wind  | Lecture based on video projection | 2 hours |
| 3 | Mercury (geological features and the role played in the formulation of theories regarding planet formation) | Lecture based on video projection | 2 hours |
| 4 | Venus (geological processes, landforms, soil chemistry, volcanism) | Lecture based on video projection | 2 hours |
| 5 | Planet Earth I (summary of Earth’s geology)  | Lecture based on video projection | 2 hours |
| 6 | Planet Earth II (synthesis of Earth’s volcanism) and assessment (V1) | Lecture based on video projection | 2 hours |
| 7 | Meteorites (classification, minerology), impact craters  | Lecture based on video projection | 2 hours |
| 8 | The Moon (geological processes, landforms, chemical composition of different types of lunar rocks, lunar meteorites)  | Lecture based on video projection | 2 hours |
| 9 | Mars (geological processes, volcanism, soil chemistry, Martian meteorites) | Lecture based on video projection | 2 hours |
| 10  | Jupiter (models of its interior, magnetosphere); comets (details on the impact between comet Shoemaker Levy 9 and Jupiter)  | Lecture based on video projection | 2 hours |
| 11 | The geology of Jupiter’s satellites Callisto, Europa, Ganymede, Io and Amalthea | Lecture based on video projection | 2 hours |
| 12 | Saturn (structure, rings, the geology of its satellites Titan, Mimas, Enceladus, Tethys, Dione, Rhea and Yapetus) | Lecture based on video projection | 2 hours |
| 13 | Uranus (structure, the geology of its satellites Miranda, Ariel, Umbriel, Titania and Oberon) | Lecture based on video projection | 2 hours |
| 14 | Neptune (structure, the geology of its satellite Triton); Pluto, asteroids and assessment (V2) | Lecture based on video projection | 2 hours  |

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| D | **Recommended reading for lectures** |
|  | 1. Bell J. (2008) The Martian Surface - Composition, Mineralogy and Physical Properties, Cambridge University Press, 636 p.; 2. Faure G.,Mensing T. M. (2007) Introduction to Planetary Science – The Geological Perspective, Springer, 526 p; 3. McSween H.Y. jr. (1993) - Stardust to Planets – A Geological Tour of the Universe, St. Martin’s Griffin, New York, 241 p. |
| E | **Seminar content** |
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| Week | Title of seminar | Teaching methods | Duration  |
| 1 | Notions of plate tectonics  | Lecture based on video projection, debate, case studies  | 2 hours |
| 2 | Earth’s inner structure | Lecture based on video projection, debate, case studies | 2 hours |
| 3 | Volcanism on Earth  | Lecture based on video projection, debate, case studies | 2 hours  |
| 4  | Volcanic hazards  | Documentary, debate, case studies | 2 hours |
| 5 | Revision of plate tectonics, Earth’s inner structure and volcanism  | Test | 2 hours  |
| 6  | Terrestrial rocks – generalities  | Lecture based on video projection, debate, case studies | 2 hours |
| 7  | Geological processes and landforms: mountains  | Lecture based on video projection, debate, case studies  | 2 hours; tectonic map of the Earth  |
| 8  | Revision of rocks and landforms | Oral assessment  | 2 hours; tectonic map of the Earth  |
| 9  | The satellites of the outer planetsAsteroids and comets  | Documentary, debate and case studies  | 2 hours |
| 10 | Volcanism in the Solar System  | Lecture based on video projection, debate, case studies | 2 hours |
| 11 | Analysis and classification of extraterrestrial rocks (lunar rocks, meteorites)  | Lecture based on video projection, debate, case studies | 2 hours |
| 12 | Geological maps and satellite maps (photogeologic mapping: the Moon and Mars)  | Lecture based on video projection, debate, case studies | 2 hours  |
| 13 | Comparison between the planets of the Solar System  | Documentary, debate, case studies | 2 hours |
| 14 | Final assessment | Final assessment | 2 hours  |

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| F | **Recommended reading for seminars** |
|  | 1. Pasachoff J. M. (1998) – Astronomy, from the Earth to the Universe, 643 p.; 2. Seeds M. A. (2001) – The Solar System (2nd edition), Brooks/Cole, 616 p.www.nasa.gov  |
| G | **Education style** |
| learning and teaching methods | Lecture based on video projection; debate; case studies |
| assessment methods | Continuous assessment (lecture) – 60%; written+oral assessment and research papers (seminar) – 30% |
| Language of instruction | English  |