Module Handbook

Module Name:	Capita Selecta Earth Physics and Complex Systems
Module Level:	Bachelor
Abbreviation, if applicable:	FI2161
Sub-heading, if applicable:	
Courses included in the module, if applicable:	
Semester/term:	Second year
Module coordinator(s):	
Lecturer(s):	
Language:	Bahasa Indonesia
Classification within the curriculum:	~~General Studies~~ / ~~Major Subject~~ / Elective Studies
Teaching format / class hours per week during the semester:	3 hours lectures, 2 hours tutorial
Workload:	3 hours lectures, 2 hours tutorial and structured activities, 2 hours individual study, 2 hours laboratory work per week, 16 weeks per semester, and total 144 hours a semester
Credit Points:	3
Requirements:	1. FI2101 Wave 2. FI2102 Mathematical Physics IA 3. FI2201 Mathematical Physics IIA 4. FI2202 Electricity and Magnetism
Learning goals/competencies:	Knowledge: – Able to describe the structure of the Earth and to explain the dynamics of the Earth. – Able to recognize and understand the different types of earth materials (rocks), as well as the forming process and the cycle. – Demonstrate the understanding of various physical quantities of earth materials and able to apply various physical methods for measuring the quantities. – Demonstrate the understanding of the basic principles and characteristics of complex systems which include interactions between variables, the emergence of collective behavior, and the ability of self-organization. Skills: – Able to understand the principles of complex systems modeling, including input and output variables relationship (linear—non linear), space-time dimensionality, and the nature of the mathematical relationship between variables (deterministic—non deterministic). – Able to map the characteristics of complex systems that exist in various natural phenomena. Competence: – Able to design a solution to various problems of earth complex systems which includes planning and selecting appropriate methods. – Able to execute the plan within a specified time and able to verify the results obtained.
Content:	Introduction to Earth and its interior, from the core, mantle, up to the crust as well as the dynamics and tectonics theory. The introduction of rock parameters such as porosity, permeability, and cracks. The introduction of several types of rocks (carbonate, sandstone, shale, clay), rock mineralogy. Gravity exploration

	method: from theory, data processing to interpretation, magnetic, elastsitas rocks, refraction seismic, reflection seismic, geoelectric, electromagnetic methods, the complex system of the earth.
Study/exam achievements:	Students are considered to be competent and pass if at least get 50% of maximum mark of the mid-term test, final examination, quizzes and home work.
Forms of Media:	Slides and LCD projectors, blackboards, lab.
Literature:	1. W.M. Telford, L. P. Geldart, R. E. Sheriff, Applied Geophysics, Cambridge University Press. 2. Robert Sheriff & Geldart, Exploration Seismology, Cambridge University Press. 3. H. J. Pain, Physics Vibration and waves, John Willey and sons 4. J. Hinze, Ralph R. B. Von Frese, Alif Saad, Gavity and Magnetic Exploratilliam, Cambridge University Press 5. Nino Boccara, Modeling Complex Systems, Springer. 6. Wahyu Srigutomo, Kapita Selekta Fisika Sistem Kompleks 7. Naotatsu Shikazono, Introduction to Earth and Planetary System Science, Springer 8. Lowrie Prelims, Fundamentals of Geophysics, Cambridge University Press.
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