



Bachelor Program in Geophysics

Faculty of Mathematics and Natural Sciences
HASANUDDIN UNIVERSITY

4. Geodynamics

Module Name	:	Geodynamics
Module Level	:	Bachelor
Code, if applicable	:	23H06121702
Subtitle, if applicable	:	-
Courses, if applicable	:	Geodynamics
Semester(s) in which the module is taught	:	IV (Fourth Semester)
Module coordinator(s)	:	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv.
Lecturer(s)	:	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Muhammad Fawzy Ismullah Massinai, S.Si, M.T., Andi Muhammad Pramadi, S.T., M.Eng., Ph.D.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Elective course in the second year for Bachelor Degree in Geophysics
Type of teaching, contact hours	:	This course is delivered through Lectures (i.e., Project/Case-based learning), complemented by structured assignments (paper review, project/case evaluation) and independent study. Contact hours consist of 100 minutes lectures per week, plus 120 minutes per week for each of the following: structured assignments and independent study
Workload	:	Total workload is 90 hours per semester, consisting of 28 hours for lectures, and 31 hours each for structured assignments and independent study
Credit points	:	2 SKS (3.2 ECTS)
Requirements according to the examination regulations	:	Students are eligible to attend the examination if their absences are less than 20% of the lectures
Recommended prerequisites	:	-
Module objectives/intended learning outcomes	:	After completion of this module, students will be able to: CLO 1. Students are able and skilled in explaining Geodynamics concepts and applying them to other related fields; CLO 2. Students are able to use geophysical principles to communicate with the wider community in conveying natural phenomena related to Geodynamics.



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		The following is the mapping of the ILO and the CLO of this course: <table> <tr> <th></th><th>ILO 8</th><th>ILO 9</th></tr> <tr> <td>CLO 1</td><td>✓</td><td></td></tr> <tr> <td>CLO 2</td><td></td><td>✓</td></tr> </table>		ILO 8	ILO 9	CLO 1	✓		CLO 2		✓
	ILO 8	ILO 9									
CLO 1	✓										
CLO 2		✓									
Content	:	1. The origin of the Earth's formation, the age of the Earth, the formation of the solar system, the Earth-Moon system, and the time of core formation. 2. Travel time and depth-velocity curves, Earth's free oscillations, density variations, and physical properties of the Earth, core-mantle boundary. 3. Formation of the Earth's core, experimental methods, element abundance, and formation of the outer core. 4. Earth's crustal structure, chemical composition of the lithosphere 5. Subsurface waves, tomography 6. Melting point at depth, adiabatic temperature, Earth's core heat regime, Earth's thermal history. 7. Fourier's Law, Heat flow measurements, Surface heat flow, Convection currents. 8. Heat from radioactive decay, Heat in continents 9. Compensation models, Geoid anomalies 10. Topographic forming forces, Geoid 11. Elasticity and plasticity, Mantle rheology, Mantle convection, Earth cooling 12. Crustal rheology, viscoelasticity, elastic and plastic properties of the Earth's crust 13. Geochronology and radioactivity, Reservoir geochemistry, Noble gas systems									



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Study and examination requirements	Participants are marked based on their performance in theory: Case Study (75%), and Written Examination (25%). Students are marked based on their percentage of points obtained and based on the following grade scale: <table><tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr><tr><td>85 – 100</td><td>A</td><td>4.00</td></tr><tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr><tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr><tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr><tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr><tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr><tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr><tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr><tr><td>< 40</td><td>E</td><td>0.00</td></tr></table>	Percentage of Achievement	Grade	Conversion Value	85 – 100	A	4.00	80 - <85	A-	3.75	75 - < 80	B+	3.5	70 - < 75	B	3.0	65 - < 70	B-	2.75	60 - < 65	C+	2.5	50 - < 60	C	2.00	40 - < 50	D	1.00	< 40	E	0.00
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65 - < 70	B-	2.75																													
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50 - < 60	C	2.00																													
40 - < 50	D	1.00																													
< 40	E	0.00																													
Exams and assessment formats	Assessment in this course consists of a project or case study, and written examination. The project or case study is conducted in a group or individually and requires students to apply theoretical concepts to analyze and solve a problem, presented in the form of a written report. The written examination (<i>closed-book</i>, written) evaluates students understanding of fundamental concepts covered by CLO 1 and CLO 2.																														
Reading list	1. Main References: 1. Fowler C.M.R."the solid earth" Cambridge University Press. 2. Turcotte D.L."Geodynamics" John Wiley & Sons. Additional References: 1. Kearey P. dan Vine F.J. "Global Tectonics" Oxford London 2. Telford, W.M., Geldart, L.P dan Sheriff, R.E. (1990). Applied Geophysics. Second Edition. Cambridge University Press. 3. Massinai, Muhammad Altin. 2015. Geomorfologi Tektonik. Jogyakarta. Pustaka Ilmu Publishing.																														



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