19. Gravity and Geomagnetics Methods

Module Name	:	Gravity And Geomagnetic Methods
Module Level	:	Bachelor
Code, if applicable	:	23H06121003
Subtitle, if applicable	:	
Courses, if applicable	:	Geophysics
Semester(s) in which the module is taught	:	4 (Fourth Semester)
Module coordinator(s)	:	Dra. Maria, M.Si.
Lecturer(s)	:	Dra. Maria, M.Si. Sabrianto Aswad, S.Si., MT
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory 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 150 minutes lectures per week, plus 180 minutes per week for each of the following: structured assignments and independent study
Workload	:	Total workload is 135 hours per semester, consisting of 38 hours for lectures, and 48.5 hours each for structured assignments and independent study
Credit points	:	3 SKS (4.8 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. Able to discover new natural resources through exploration, analysis, and interpretation of data and information based on environmentally friendly exploration geophysical principles; CLO 2. Able to use gravimeters and magnetometers and calculate corrections in gravity and magnetic methods in measurement data;

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<td>CLO 3. Able to create contours, separate regional anomalies and residuals;

CLO 4. Able to understand simple object models and 2-dimensional cross-sectional models of anomaly contours, and able to interpret anomaly object models based on geological information or survey results using other geophysical methods;

CLO 5. Able to interpret simple object models from synthetic data models (forward modeling);

The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 4</th><th>ILO 8</th><th>ILO 11</th><th>ILO 12</th></tr>
<tr><td>CLO 1</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>CLO 2</td><td></td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>CLO 3</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td>CLO 4</td><td></td><td></td><td></td><td>✓</td></tr>
<tr><td>CLO 5</td><td></td><td></td><td></td><td>✓</td></tr>
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<tr>
<td>Content</td>
<td>:</td>
<td>1. Basic theory of gravity methods
2. Gravity data acquisition and gravity data reduction
3. Gravity data processing and interpretation
4. Basic theory of geomagnetic methods
5. Geomagnetic data acquisition, processing, and interpretation</td>
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<td>Study and examination requirements</td>
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<td>Participants are marked based on their performance in theory: Project Study (90%), Written Examination (10%)

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>
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<td>Exams and assessment formats</td>
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<td>Assessment in this course consists of a project study, a written examination. The project study is conducted individually or in groups and requires students to apply theoretical concepts to analyze and solve a problem, culminating in a written report that is evaluated and may be revised after feedback. The written examination (closed-book, written) evaluates students' understanding of fundamental concepts covered in CLO 1, CLO 2, CLO 3, CLO 4, and CLO 5.</td>
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<td>Reading list</td>
<td></td>
<td>Main References:

1. Dobrin, 1983. Introduction to Geophysical Prospecting, Mc.Graw-Hill

2. Blakely, R.J. 1996. Potensial Theory in Gravity and Magnetic Applications. Cambridge University Press. Cambridge, UnitedKingdom.

3. Telford, W.M., Geldart, L.P., Sheriff, R.E. 1990. Applied Geophysics. Cambridge University Press. Cambridge, UnitedKingdom.

Additional References:</td>
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		Reynold, J. M.. 1997. An Introduction to Applied and Environmental Geophysics. Jhn Wiley and Sons Inc.. England.
Last revision date		July 1st, 2025