9. Mapping and Geographic Information System (GIS)

Module Name	:	Mapping and Geographic Information System (GIS)
Module Level	:	Bachelor
Code, if applicable	:	23H06110704
Subtitle, if applicable	:	-
Courses, if applicable	:	Mapping and Geographic Information System (GIS)
Semester(s) in which the module is taught	:	II (Second Semester)
Module coordinator(s)	:	Dr. Samsu Arif, M.Si.
Lecturer(s)	:	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Dr. Samsu Arif, M.Si., Syamsuddin, S.Si., MT., Aswar Syafnur, S.Si., M.Eng.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in the first year for Bachelor Degree in Geophysics
Type of teaching, contact hours	:	This course is delivered through Lectures (i.e., Case-based learning and Practical Work), complemented by structured assignments (paper review, project/case evaluation) and independent study. Contact hours consist of 150 minutes lectures per week and 170 minutes, plus 180 minutes per week for each of the following: structured assignments and independent study
Workload	:	Total workload is 180 hours per semester, consisting of 38 hours for lectures, 43 hours for practical work, and 49.5 hours each for structured assignments and independent study.
Credit points	:	4 SKS (6.4 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 applying cartographic concepts and implementing them in other related fields; CLO 2. Students are able to use and interpret topographic maps;

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<td>CLO 3. Able to apply basic applications of computer-based spatial data handling and analysis techniques;

The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 7</th><th>ILO 10</th><th>ILO 13</th></tr>
<tr><td>CLO 1</td><td>✓</td><td></td><td></td></tr>
<tr><td>CLO 2</td><td></td><td>✓</td><td></td></tr>
<tr><td>CLO 3</td><td></td><td></td><td>✓</td></tr>
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<tr>
<td>Content</td>
<td>:</td>
<td>1. Basic Concepts of Cartography and GIS
2. Maps, Coordinate Systems, and Determination of Horizontal and Vertical Positions
3. Elevation Differences (Leveling, Trigonometric, and Barometric Methods)
4. Mapping & Cartography
5. Contour Lines
6. History, Theories, and Basic Concepts of Geographic Information Systems
7. Digital Maps (Software, Conversion of Analog Maps to Digital Maps, Digitization)</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: Case Study (75%), Practical Work (25%)

Students are marked based on their percentage of points obtained and based on the following grade scale:
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<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>Student performance in this course is evaluated through case-based tasks and practical work activities. Students are provided with real or simulated cases, which they analyze in depth by processing and interpreting data, preparing a written report, and presenting their findings. The case studies are evaluated by the lecturer, with feedback given for revisions. Final assessment is determined by the quality of the analysis, accuracy of problem-solving, and the completeness of the revised report. The practical work component involves hands-on laboratory activities where students process and interpret spatial data of topography mapping and GIS, followed by the preparation of a practical work report.</td>
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<td>Reading list</td>
<td></td>
<td>Main references:

1. Brinker, Russell C,. Paul R.Wolf, 1986, Elementary Surveying, Harper & Row Publisher Inc, London

2. Massinai, Muhammad Altin, 2016. Pemetaan, Program Studi Geofisika UNHAS

3. Purworaharjo,U; 1986 , Pengukuran Topografi, Jurusan Teknik Geodesi ITB Bandung.</td>
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4. Aronoff,S .1990.Geograpic Information System : A Management Perspective. WDL Publication. Ottawa
5. Burrough, P.A.1989.Principles of Geographic Information System For Land Resources Assessment.MONOGRAPHS ON Soil and Resources Survey No.12 Clarendom Press.Oxford.
6. 6. Fischer,M.M.and Nijkamp, (eds).1993.Geographic Information Syetem, Spatial Modelling and Policy Evalution.Verlag .Berlin.

Additional references:

1. Heiskanen, Weikko,. Helmut Moritz, Physical Geodesy, W.H.Freeman and Company, San Francisco.
2. Mikhail,E.M,. Gordon Gracie, 1981, Analysis and Adjusment of Survey Measurement, Van Nostrand Reinhold Company, New York.
3. Vanicek and Krakiwsky, 1982, Geodesy: The Concepts, Nort Holland Publishing Company, Amsterdam.
4. Monmonier, M.S. 1982. Computer Assisted Cartograpy-Principle and Prospects
5. Bolstad, Paul. 2019. GIS Fundamental: A First Text on GIS. XanEdu Publishing Inc.USA.
6. Star. J.and Estes, J.E.1990.Geographic Information System: An Introduktion. Prentice Hall, Englewood Cliff.New Jersey