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|   | <b>INSTITUT TEKNOLOGI SEPULUH NOPEMBER</b><br><b>FACULTY OF CIVIL PLANNING AND GEO ENGINEERING</b><br><b>GEOPHYSICAL ENGINEERING DEPARTMENT</b><br><b>UNDERGRADUATE PROGRAM (S1)</b>   |                                  |
| <b>Course</b>  | <b>Course Name</b>   | <b>Geoelectrical Exploration</b> |
|  | <b>Course Code</b>   | <b>CF234419</b>                  |
|  | <b>Credit</b>  | <b>3 (Three)</b>                 |
|  | <b>Semester</b>  | <b>4 (Four)</b>                  |
| <b>COURSE DESCRIPTION</b>  |  |                                  |
| Geoelectricity is a geophysical method which aims to determine the electrical properties of rock layers below the ground surface by flowing electric current into the ground. This lecture will explain the concept of geoelectricity in several methods, namely Self Potential (SP), Resistivity and Induced Polarization (IP) and its application in hydrogeology, geotechnics, mining exploration, disasters and the environment. Students will gain experience in geoelectric exploration planning starting from planning, data acquisition, processing and interpretation of geoelectric data so that a basic understanding of concepts and techniques will help students compete in the world of work. Activities will be carried out in group work so that students can think critically and practice teamwork to achieve common goals. |  |                                  |
| <b>PROGRAM LEARNING OUTCOMES (PLO)</b>   |  |                                  |
| PLO-5  | Able to explain the concepts and principles of geophysical engineering methods that utilize geological, geospatial, instrumentation and information technology data to create or modify models to solve complex geophysical and geophysical engineering problems in depth and procedurally by prioritizing conservation concepts and principles environment, occupational safety and health in the laboratory and field, current principles and issues in legal, economic, environmental, socio-cultural, political, health and safety aspects, sustainable development as well as the development of the latest technology and advanced materials in the field of geophysical engineering.  |                                  |
| PLO-6  | Able to apply processes or components of geophysical engineering methods to create or modify models that utilize geological, geospatial, instrumentation and information technology data procedurally starting from identifying, formulating, analyzing and finding the source of the problem, proposing the best solution to solve the problem, designing and operationalizing the process, processing systems and hardware and software equipment required in existing geophysical engineering designs, local and national resources as well as engineering design and analysis tools that are most appropriate, effective and efficient in solving complex geological and geophysical engineering problems in depth by taking into account factors law, economics, environment, socio-cultural, political, health, public safety, culture, and sustainable development. |                                  |
| <b>COURSE LEARNING OUTCOMES (CLO)</b>  |  |                                  |
| CLO-1  | Students are able to apply the concept of Geoelectric Methods (basic sciences, physical parameters and basic laws)   |                                  |
| CLO-2  | Students are able to implement Geoelectric Methods procedurally starting from data search, processing, subsurface geology and modeling to solve in-depth problems  |                                  |



| SUB COURSE LEARNING OUTCOMES (SUB CLO)  |  |
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| Sub CLO-1   | [C4, P3, A3] Students are able to explain the basic concepts and principles of electricity and their relationship to the physical characteristics of rocks |
| Sub CLO-2   | [C4, P3, A3] Students are able to implement the Geoelectric Exploration – Resistivity method procedurally  |
| Sub CLO-3   | [C4, P3, A3] Students are able to implement the Geoelectric Exploration method - Induced Polarization procedurally   |
| Sub CLO-4   | [C4,P3,A3] Students are able to implement the Geoelectric Exploration - Self Potential method procedurally   |
| STUDY MATERIALS   |  |
| <ul style="list-style-type: none"><li>• Introduction</li><li>• The principle of ohm's law in geoelectric methods</li><li>• Electrical Properties of Rocks</li><li>• The current electrode on the earth is layered</li><li>• Configuration Type</li><li>• Acquisition, processing and interpretation of 1D, 2D and 3D Geoelectrics</li><li>• Acquisition, processing and interpretation of the Self Potential (SP) Method</li><li>• Acquisition, processing and interpretation of Induced Polarization (IP) Method</li></ul> |  |
| PRECONDITION  |  |
| Geophysical Data Modeling, Mathematical Geophysics, Rock Physics, Geodynamics   |  |
| REFERENCES  |  |
| <ol style="list-style-type: none"><li>1. Telford, W., Geldart, L. P., Sheriff, R. E. (1976). Applied Geophysics. Cambridge Univ Press, Cambridge.</li><li>2. Zhdanov, MS, Keller, GV, The Geoelectrical Methods in Geophysical Exploration, Elsevier, 1994.</li><li>3. Geophysical Journal</li></ol>  |  |