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|    | <b>INSTITUT TEKNOLOGI SEPULUH NOPEMBER</b>   |                    |
|   | <b>FACULTY OF CIVIL PLANNING AND GEO ENGINEERING</b>   |                    |
|   | <b>GEOPHYSICAL ENGINEERING DEPARTMENT</b>  |                    |
|   | <b>UNDERGRADUATE PROGRAM STUDY</b>   |                    |
|   | <b>Course</b>  | <b>Course Name</b> |
| <b>Course Code</b>  |  | <b>CF234740</b>    |
| <b>Credit</b>   |  | <b>3 (Three)</b>   |
| <b>Semester</b>   |  | <b>7 (Seven)</b>   |
| <b>COURSE DESCRIPTION</b>   |  |                    |
| Students understand the rules of geothermal exploration within the framework of a total geothermal potential development project, both in technical, economic and legal aspects. This course aims to understand the geothermal conceptual model through processing geophysical, geological and geochemical data and a physical model approach based on the rules for increasing geothermal gradients due to volcanic and non-volcanic phenomena. The conceptual model was built based on an integrative study of various geological exploration results as an initial approach, then through a geophysical methodological approach to describe the alleged prospect area which will be strengthened by geochemical measurement evidence of geothermal phenomena on the earth's surface. |  |                    |
| <b>PROGRAM LEARNING OUTCOMES (PLO)</b>  |  |                    |
| PLO-5   | Able to explain concepts, principles of geophysical methodology to create or modify models in solving complex geophysical engineering problems in depth and procedurally by prioritizing concepts and principles of environmental preservation, occupational safety and health in laboratories and fields, principles and current 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 procedurally starting from identifying, formulating, analyzing and finding the source of problems, proposing the best solutions to solve problems, designing and operationalizing processes, processing systems and equipment required in existing geophysical engineering designs, utilizing resources local, national resources as well as the most appropriate, effective and efficient engineering design and analysis tools in solving geophysical engineering problems in depth by taking into account legal, economic, environmental, socio-cultural, political, health, public safety, culture and sustainable development factors. development). |                    |
| <b>COURSE LEARNING OUTCOMES (CLO)</b>   |  |                    |
| CLO-1   | C4, P3, A3] Able to organize secondary data from geothermal exploration studies and present it again according to the needs or objectives of the activity as well as evaluate the operational procedures of the geophysical engineering technology carried out   |                    |
| <b>SUB COURSE LEARNING OUTCOMES (SUB CLO)</b>   |  |                    |
| Sub CLO-1   | [C4,P3,A3] Be able to explain the concepts and stages of Geothermal Exploration  |                    |
| Sub CLO-2   | [C4,P3,A3] Be able to understand the relationship between geothermal energy and geological conditions and be able to explain geothermal fields in Indonesia.   |                    |



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| Sub CLO-3  | [C4,P3,A3] Be able to analyze a geophysical case study in geothermal exploration   |
| Sub CLO-4  | [C4,P3,A3] Able to create simple conceptual models of geothermal reservoirs that are integrated with geoscience studies and present them in scientific writing and communication |
| <b>STUDY MATERIALS</b>   |  |
| <b>Basic concepts of geothermal systems</b> , Procedural management of geothermal exploration: geological, geophysical and geochemical studies and supporting studies (social, cultural, legal, environmental, sustainable), Making conceptual models, calculating reserves, Introduction to geothermal exploitation   |  |
| <b>REQUIREMENTS</b>  |  |
| Structural Geology<br>Gravity and Magnetic Exploration<br>Electromagnetic Exploration  |  |
| <b>REFERENCES</b>  |  |
| <ol style="list-style-type: none"><li>1. Telford, W., Geldart, LP, Sheriff, RE (1976). Applied Geophysics. Cambridge Univ Press, Cambridge.</li><li>2. Zhdanov, M.S. (2009). Geophysical Electromagnetic Theory and Methods. Elsevier.</li><li>3. Handbook of Geothermal Energy, Editors: Edwards, LM, Chilingar, GV et al. , Gulf Publishing Company, 1982, 613 pp.</li><li>4. Goff, F., Janik, CJ (2000), Geothermal Systems, Editors: Haraldur Sigurdsson, Encyclopedia of Volcanoes, Academic Press, pp. 817-8344.</li><li>5. National and international Geophysics Journals - indexed</li></ol> |  |