



# Bachelor Program in Geophysics

Faculty of Mathematics and Natural Sciences  
HASANUDDIN UNIVERSITY

## 8. Seismic Reflection

|                                                       |   |                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Name                                           | : | Seismic Reflection                                                                                                                                                                                                                                                                                                                                                                                      |
| Module Level                                          | : | Bachelor                                                                                                                                                                                                                                                                                                                                                                                                |
| Code, if applicable                                   | : | 23H06122103                                                                                                                                                                                                                                                                                                                                                                                             |
| Subtitle, if applicable                               | : | -                                                                                                                                                                                                                                                                                                                                                                                                       |
| Courses, if applicable                                | : | Geophysics                                                                                                                                                                                                                                                                                                                                                                                              |
| Semester(s) in which the module is taught             | : | 4 (Fourth Semester)                                                                                                                                                                                                                                                                                                                                                                                     |
| Module coordinator(s)                                 | : | Prof. Dr. Halmar Halide, M.Sc                                                                                                                                                                                                                                                                                                                                                                           |
| Lecturer(s)                                           | : | Prof. Dr. Halmar Halide, M.Sc                                                                                                                                                                                                                                                                                                                                                                           |
| 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 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          | : | <p>After completion of this module, students will be able to:</p> <p>CLO 1. Students realize that learning outcomes are a gift from God Almighty, so in achieving these outcomes, they must adhere to academic values, norms, and ethics;</p> <p>CLO 2. Students can learn the basic principles of seismic reflection;</p> <p>CLO 3. Students can learn the principles of seismic data acquisition.</p> |



# Bachelor Program in Geophysics

Faculty of Mathematics and Natural Sciences

HASANUDDIN UNIVERSITY

|                                    |       | <p>CLO 4. Students can design parameters for data collection in the field.</p> <p>CLO 5. Students can learn and apply the principles of seismic data processing.</p> <p>The following is the mapping of the ILO and the CLO of this course:</p> <table><tr><td></td><td>ILO 4</td><td>ILO 6</td><td>ILO 11</td><td>ILO 12</td></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></table>                                                                                         |                           | ILO 4  | ILO 6            | ILO 11   | ILO 12 | CLO 1 | ✓        |    |      |           | CLO 2 |     | ✓         |   |     | CLO 3     |    |      | ✓         |    | CLO 4 |           |   | ✓    |  | CLO 5 |  |  | ✓ | ✓ |
|------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------|------------------|----------|--------|-------|----------|----|------|-----------|-------|-----|-----------|---|-----|-----------|----|------|-----------|----|-------|-----------|---|------|--|-------|--|--|---|---|
|                                    | ILO 4 | ILO 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ILO 11                    | ILO 12 |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| CLO 1                              | ✓     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| CLO 2                              |       | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| CLO 3                              |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                         |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| CLO 4                              |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                         |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| CLO 5                              |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                         | ✓      |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| Content                            | :     | <ol style="list-style-type: none"><li>1. Land and marine seismic surveys (2D and 3D)</li><li>2. Basic concepts of seismic data processing and time series analysis</li><li>3. Principles and application of static correction</li><li>4. Velocity analysis and migration</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |
| Study and examination requirements |       | <p>Participants are marked based on their performance in theory: Project/Case Study (84%), Assignments (6%), and Written examination (10%).</p> <p>Students are marked based on their percentage of points obtained and based on the following grade scale:</p> <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 - &lt;85</td><td>A-</td><td>3.75</td></tr><tr><td>75 - &lt; 80</td><td>B+</td><td>3.5</td></tr><tr><td>70 - &lt; 75</td><td>B</td><td>3.0</td></tr><tr><td>65 - &lt; 70</td><td>B-</td><td>2.75</td></tr><tr><td>60 - &lt; 65</td><td>C+</td><td>2.5</td></tr><tr><td>50 - &lt; 60</td><td>C</td><td>2.00</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 |  |       |  |  |   |   |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |        |                  |          |        |       |          |    |      |           |       |     |           |   |     |           |    |      |           |    |       |           |   |      |  |       |  |  |   |   |



# Bachelor Program in Geophysics

Faculty of Mathematics and Natural Sciences

HASANUDDIN UNIVERSITY

|                              |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |   |      |  |
|------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|------|--|
|                              |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40 - < 50 | D | 1.00 |  |
|                              |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | < 40      | E | 0.00 |  |
| Exams and assessment formats |    | Assessment in this course consists of a project or case study, assignments, and written examination. The project or case 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. Assignments are completed individually and may include problem-solving tasks, data processing, or short essays; these are submitted in written form and may involve graphical or computational outputs. 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.                                                                                                                                                                                                                                                                                     |           |   |      |  |
| Reading list                 | 1. | <p><b>Main References:</b></p> <ol style="list-style-type: none"> <li>Brian J. Evans Page, A Handbook for Seismic Data Acquisition in Exploration number 7, 1997, SEG, Tulsa</li> <li>Dale G. Stone, 1994, Designing Seismic Surveys in Two and Three Dimensions, SEG, Tulsa</li> <li>Ozdogan Yilmaz and Stephen M. Doherty, 2000, Seismic Data Analysis: Processing, Inversion, and Interpretation of SeismicData, SEG, Tulsa</li> <li>W. M. Telford, L. P. Geldart and R. E. Sheriff, 1991, Applied Geophysics (2nd edition), Cambridge University Press</li> </ol> <p><b>Additional References:</b></p> <ol style="list-style-type: none"> <li>Julien Meunier, Seismic Acquisition from Yesterday to Tomorrow: 2011 Distinguished Instructor Short Course, 2011, SEG, Tulsa</li> <li>Hua-Wei Zhou, 2014, Practical Seismic Data Analysis, Cambridge University Press</li> <li>Roy O. Lindseth, 1982, Digital Processing of Geophysical Data - A Review (Course Notes No. 1), SEG, Tulsa</li> </ol> |           |   |      |  |
| Last revision date           |    | July 1 <sup>st</sup> , 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |   |      |  |