



**Universitas Negeri Surabaya**  
**Faculty of Engineering,**  
**Building Engineering Education Undergraduate Study Program**

Document Code

## SEMESTER LEARNING PLAN

| Courses  | CODE  | Course Family  | Credit Weight              |   |                   | SEMESTER  | Compilation Date      |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|---|--|----------------------------|---|-------------------|---|-----------------------|---|---|----|----|----|----|----|----|----|--|-----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Foundation Engineering                               | 8320502230  | Compulsory Study Program Subjects  | T=2                        | P=0   | ECTS=3.18         | 3   | April 27, 2023        |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AUTHORIZATION  | SP Developer  |  | Course Cluster Coordinator |   |                   | Study Program Coordinator                       |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Dra. Nur Andajani, M.T.   |  | Dra. Nur Andajani, M.T.    |   |                   | Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T. |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Learning model                                       | Case Studies  |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Program Learning Outcomes (PLO)                      | PLO study program that is charged to the course   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Program Objectives (PO)   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | PLO-PO Matrix   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |   | P.O  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PO Matrix at the end of each learning stage (Sub-PO) | PO Matrix at the end of each learning stage (Sub-PO)  |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |   | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 5%;">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  | P.O | Week |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| P.O  | Week  |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1   | 2  | 3                          | 4   | 5                 | 6   | 7                     | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Short Course Description                             | This course provides an understanding of the meaning and function of foundations, types and types of foundations as well as an understanding of calculating the bearing capacity of foundations, both shallow foundations and deep foundations. Calculation of the bearing capacity of shallow foundations with homogeneous soil and layered soil with centric vertical loads, centric inclination, with one and two direction eccentricity, for both sand and clay soils. Calculate shallow foundation settlement. Provide an understanding of the calculation of the bearing capacity of foundations in piles for sand and clay soil, homogeneous and layered soil as well as retaining walls |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| References   | Main :  |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Braja, M. Das 2012. 1C Principles Of Foundation Engineering 1D . PWS-KENT: Boston<br>2. Andayani, Nur., 2012. 1CPondasi Dangkal 1D. Jurusan Teknik Sipil Unesa   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Supporters:   |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Supporting lecturer                                  | Dra. Nur Andajani, M.T.<br>Mochamad Firmansyah Sofianto, S.T., M.Sc., M.T.  |  |                            |   |                   |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Week-  | Final abilities of each learning stage (Sub-PO)   | Evaluation   |                            | Help Learning, Learning methods, Student Assignments, [ Estimated time] |                   | Learning materials [ References ]               | Assessment Weight (%) |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |   | Indicator  | Criteria & Form            | Offline ( offline )   | Online ( online ) |   |                       |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| (1)  | (2)   | (3)  | (4)                        | (5)   | (6)               | (7)   | (8)                   |   |   |    |    |    |    |    |    |    |  |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |   |   |  |    |
|---|---|--|---|---|---|--|----|
| 1 | Able to understand the meaning of foundations, the main function of foundations, calculating the bearing capacity of shallow foundations using the Terzaghi formula | -Able to explain the meaning & function of foundations and shear failure of shallow ponds.<br>- Able to calculate the bearing capacity of shallow foundations using the Terzaghi formula               | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers<br>2 x 50 minutes                               | Lectures, discussions and questions and answers<br>2 x 50 minutes                               |  | 0% |
| 2 | Able to understand shallow foundations with vertical centric loads  | Able to calculate the bearing capacity of shallow foundations with vertical centric loads with overall shear failure and local shear failure   | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving assignments<br>2 x 50 minutes | Lectures, discussions and questions and answers as well as giving assignments<br>2 x 50 minutes |  | 0% |
| 3 | Able to understand the influence of ground water level on calculating the bearing capacity of foundations   | 1.Able to analyze the influence of the ground water level on calculating the bearing capacity of the foundation<br>2.Able to calculate the bearing capacity of shallow foundations with MAT conditions | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving<br>2 X 50 assignments         |   |  | 0% |
| 4 | Able to understand shallow foundations with inclined centric loads & eccentric loads  | Able to calculate the bearing capacity of shallow foundations with inclined centric loads & eccentric loads  | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving<br>2 X 50 assignments         |   |  | 0% |
| 5 | Able to understand shallow foundations with inclined centric loads & eccentric loads  | Able to calculate the bearing capacity of shallow foundations with inclined centric loads & eccentric loads  | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving<br>2 X 50 assignments         |   |  | 0% |
| 6 | Able to understand shallow foundations on clay soil layers  | Able to calculate the bearing capacity of shallow foundations on a layer of clay soil  | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving<br>2 X 50 assignments         |   |  | 0% |

|    |   |   |   |  |  |  |    |
|----|---|---|---|--|--|--|----|
| 7  | Able to understand shallow foundations on sandy soil layers   | Able to calculate the bearing capacity of shallow foundations on a layer of sandy soil                                      | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 8  | Able to understand shallow foundation settlement  | Able to calculate shallow foundation settlement   | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 9  | UTS   |   |   | 2 X 50   |  |  | 0% |
| 10 | Able to understand the meaning of foundations in piles and drilled piles, general calculations of pile foundations. | Students can explain the meaning of deep foundation.  | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers 2 X 50                               |  |  | 0% |
| 11 | Students are able to understand foundations in piles based on sandy soil laboratory data                            | Able to calculate the bearing capacity of foundations for homogeneous sand & layered sand                                   | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 12 | Students are able to understand foundations in piles based on laboratory data for homogeneous clay & layered clay   | Able to calculate the bearing capacity of foundations in piles based on laboratory data for homogeneous clay & layered clay | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 13 | Students are able to understand foundations in piles based on sondir data   | Able to calculate the bearing capacity of foundations in piles based on sondir data   | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 14 | Students are able to understand the foundations of group piles  | Able to calculate the bearing capacity of group pile foundations  | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 15 | Students are able to understand retaining walls   | Able to calculate the bearing capacity of retaining walls   | <b>Criteria:</b><br>Full marks are obtained if you do all the questions correctly | Lectures, discussions and questions and answers as well as giving 2 X 50 assignments |  |  | 0% |
| 16 |   |   |   |  |  |  | 0% |

### Evaluation Percentage Recap: Case Study

| No | Evaluation | Percentage |
|----|------------|------------|
|    |            | 0%         |

#### Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.