

## MODULE DESCRIPTION FORM

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| <b>Module Name:</b>                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Foundation Engineering II                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Module Code:</b>                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CE 429                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Semester / Year:</b>                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Second Semester / Fourth Year (2024–2025)                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Date of Preparation of this Description:</b>                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| January 18 2025                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Available Attendance Formats:</b>                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Full time                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Total Credit Hours / Total Units:</b>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Total tuition hours: 60 hrs./semester<br>Theory: 3 hrs./week<br>Tut.: 1 hr./week |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Name of the Course Coordinator (if there are multiple names):</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Assist. Prof. Dr. Hussein Hadi Hussein                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Module Objectives:</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Module Objectives</b>                                                         | <p>Objective 1: Study the load capacity of pile foundations.</p> <p>Objective 2: Study the lateral earth pressure of the soil.</p> <p>Objective 3: Study the retaining walls.</p> <p>Objective 4: Study the sheet piles.</p>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>1. Teaching and Learning Strategy</b>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Strategy:</b>                                                                 | <p>Preparation of practical engineers in the field of deep foundations and other structural members underground surface who are characterized by a high level of knowledge and technological innovation, and work in with internationally approved discreet standards of quality assurance and academic accreditation of corresponding engineering programs with a commitment to ethics of engineering career.</p> <p>Enable students to learn and understand the various applications for deep foundations and other structural members underground surface according to the aims of the course.</p> |

## 2. Module Structure

| Week | Hours | Required Learning Outcomes                                                                                                                                                                          | Unit or subject name                | Learning method                                                                                                  | Evaluation method                                                                                                                                |
|------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | 4     | Definition, types of Piles and Their Structural Characteristics                                                                                                                                     | Chapter One: Pile Foundations       | Theoretic al lectures, discussion and dialogue, brain storming, examples and questions used to achieve the goals | Daily exams, quizzes, documented examination s, quarterly exams, final exams, oral questions and discussions during the lectures, and home works |
| 2    | 4     | Estimating of Pile Length, Point Bearing Piles, Friction Piles, Installation of piles, load transfer mechanism                                                                                      |                                     |                                                                                                                  |                                                                                                                                                  |
| 3    | 4     | Pile capacity in cohesion less soils, in cohesive soil (alpha and lambda equations)                                                                                                                 |                                     |                                                                                                                  |                                                                                                                                                  |
| 4    | 4     | Examples on item of third week, ile capacity for soil (c-φ) soils                                                                                                                                   |                                     |                                                                                                                  |                                                                                                                                                  |
| 5    | 4     | Determination of Pile capacity from in situ tests (SPT). Negative skin friction, Tension piles                                                                                                      |                                     |                                                                                                                  |                                                                                                                                                  |
| 6    | 4     | Group of piles: capacity (two modes of failure: single and block) and efficiency.                                                                                                                   |                                     |                                                                                                                  |                                                                                                                                                  |
| 7    | 4     | Examples on item of sixth week, Pile group subjected to moment, Pile load test                                                                                                                      |                                     |                                                                                                                  |                                                                                                                                                  |
| 8    | 4     | Settlement of pile and pile group.                                                                                                                                                                  |                                     |                                                                                                                  |                                                                                                                                                  |
| 9    | 4     | Introduction to lateral earth pressure theory, active lateral pressure by Rankine theory for (horizontal surface). Problem                                                                          | Chapter Two: Lateral Earth Pressure |                                                                                                                  |                                                                                                                                                  |
| 10   | 4     | Passive lateral pressure by Rankine theory for (horizontal surface), Active and Passive lateral pressure by Rankine theory for (inclined surface). Problem.                                         |                                     |                                                                                                                  |                                                                                                                                                  |
| 11   | 4     | Coulomb theory for active and passive lateral pressures. Problem                                                                                                                                    |                                     |                                                                                                                  |                                                                                                                                                  |
| 12   | 4     | Definitions and types of Retaining walls. Geotechnical proportioning of Retaining walls, Application of lateral earth pressure theories to design ,stability of retaining wall against overturning. | Chapter Three: Retaining Wall       |                                                                                                                  |                                                                                                                                                  |
| 13   | 4     | Stability of retaining wall against, Sliding, overturning. Problem                                                                                                                                  |                                     |                                                                                                                  |                                                                                                                                                  |
| 14   | 4     | Introduction type of Sheet piles, Application, Construction method. Cantilever sheet piling penetrating sandy .                                                                                     | Chapter Four: Sheet Pile            |                                                                                                                  |                                                                                                                                                  |
| 15   | 4     | Cantilever sheet piling penetrating clay , Problem                                                                                                                                                  |                                     |                                                                                                                  |                                                                                                                                                  |

**Module Evaluation**

Daily exams, quizzes, documented examinations, quarterly exams, final exams, oral questions and discussions during the lectures, and home works.

**Learning and Teaching Resources.**

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| Required textbooks (curricular books, if any)                      | Principles of Foundation Engineering by Braja M. Das and Sivakugan N, (2019), Ninth edition, SI edition. |
| Main references (sources)                                          | Foundation Analysis and Design by Joseph E. Bowles (1982)                                                |
| Recommended books and references (scientific journals, reports...) | Foundation design and Construction by Tomlinson (1980)                                                   |
| Electronic References, Websites                                    |                                                                                                          |

