

## Module (Course Syllabus) Catalogue 2022-2023

|                          |   |                       |
|--------------------------|---|-----------------------|
| College/ Institute       | Erbil Technology Collage  |                       |
| Department               | Construction and Materials Technology Engineering Dpt.  |                       |
| Module Name              | Structural Concrete Design  |                       |
| Module Code              | SCD362  |                       |
| Degree                   | Technical Diploma <input type="checkbox"/> Bachelor <input checked="" type="checkbox"/> *<br>High Diploma <input type="checkbox"/> Master <input type="checkbox"/> PhD <input type="checkbox"/> |                       |
| Semester                 | 6   |                       |
| Qualification            | PhD. In Structural Engineering  |                       |
| Scientific Title         | Asst. Professor   |                       |
| ECTS (Credits)           | 6   |                       |
| Module type              | Prerequisite <input type="checkbox"/> Core <input checked="" type="checkbox"/> * Assist. <input type="checkbox"/>   |                       |
| Weekly hours             |   |                       |
| Weekly hours (Theory)    | ( 4 )hr Class   | ( )Total hrs Workload |
| Weekly hours (Practical) | ( )hr Class   | ( )Total hrs Workload |
| Number of Weeks          | 15  |                       |
| Lecturer (Theory)        | Dr. Saad khalis Essa  |                       |
| E-Mail & Mobile NO.      | Saad.essa@epu.edu.iq  |                       |
| Lecturer (Practical)     | Aysar J. Ismael   |                       |
| E-Mail & Mobile NO.      | Aesar.ismael@epu.edu.iq   |                       |
| Websites                 |   |                       |

# Course Book

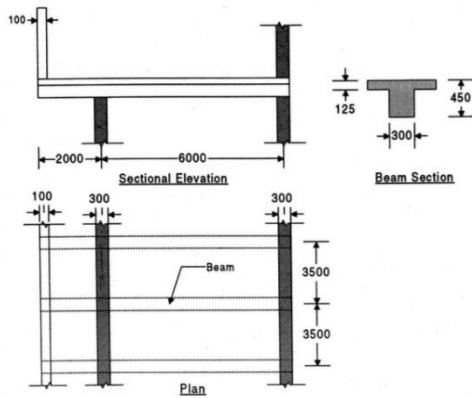
|                             |   |                |                |          |                           |
|-----------------------------|---|----------------|----------------|----------|---------------------------|
| Course Description          | <u>Reinforced concrete may be the most important material available for construction. It is used in one form or another for almost all structures, great or small-buildings, bridges, pavements, dams, retaining walls, tunnels, drainage and irrigation facilities, tanks, and so on.</u><br><br><u>Teaching reinforced concrete design, and knowing the researches relevant to the behavior of reinforced concrete members, as well as designing concrete structures motivated the preparation of this semester</u> |                |                |          |                           |
| Course objectives           | <u>The basic objective of this semester is to furnish the students with the basic understanding of the mechanics and design of reinforced concrete. The contents of the lectures conform to the latest edition of the ACI Code for the Design and Construction of Concrete Structures.</u>  |                |                |          |                           |
| Student's obligation        | Student's obligation throughout the academic year is attendance, they make assignments at every midterm, moreover, they solve analysis and design problem, they should preparesemenars, finally, they should do the final assignment or exam  |                |                |          |                           |
| Required Learning Materials | Prota structure software<br>ACI- CODE   |                |                |          |                           |
| Evaluation                  | Task  |                | Weight (Marks) | Due Week | Relevant Learning Outcome |
|                             | Paper Review  |                |                |          |                           |
|                             | Assignmen   | Homework       |                |          |                           |
|                             |   | Class Activity |                |          |                           |
|                             |   | Report         |                |          |                           |
|                             |   | Seminar        |                |          |                           |

|   |   |         |             |                         |  |
|---|---|---------|-------------|-------------------------|--|
|   |   | Essay   |             |                         |  |
|   |   | Project |             |                         |  |
|   | Quiz  |         |             |                         |  |
|   | Lab.  |         |             |                         |  |
|   | Midterm Exam  |         |             |                         |  |
|   | Final Exam  |         |             |                         |  |
|   | Total   |         |             |                         |  |
| <b>Specific learning outcome:</b>                   | The subject will give basic knowledge to principles and methods for design of Reinforced concrete members, such as<br>Beams<br>Slabs<br>Columns<br>Footings |         |             |                         |  |
| <b>Course References:</b>                           | <b>DESIGN OF REINFORCED CONCRETE,</b><br><br><b>" JACK C. McCORMAC • RUSSELL H. BROWN, NINTH EDITION</b>  |         |             |                         |  |
| <b>Course topics (Theory)</b>                       |   |         | <b>Week</b> | <b>Learning Outcome</b> |  |
| 1- Introduction                                     |   |         | 1           |                         |  |
| 2- Flexural Analysis of Beams                       |   |         | 2           |                         |  |
| 3- Strength Analysis of Beams According to ACI Code |   |         | 3           |                         |  |
| 4- Design of Rectangular Beams                      |   |         | 4           |                         |  |
| 5- Analysis and Design of T Beams                   |   |         | 5           |                         |  |
| 6- Design of L-Shaped Beams                         |   |         | 6           |                         |  |
| 7- Design of Doubly Reinforced Beams                |   |         | 7           |                         |  |
| 8- Design of One-Way Slabs                          |   |         | 8           |                         |  |
| 9- Introduction to Columns                          |   |         | 9           |                         |  |

|   |             |                         |
|---|-------------|-------------------------|
| 10- Design of Short Columns Subject to Axial Load and Bending | 1           |                         |
| 11- Slender Columns   | 11          |                         |
| 12- Footings  | 12          |                         |
| 13- Retaining walls   | 13          |                         |
| 14-Final Exams  | 14          |                         |
| <b>Practical Topics</b>                                       | <b>Week</b> | <b>Learning Outcome</b> |
|   |             |                         |
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|   |             |                         |
| <b>Questions Example Design</b>                               |             |                         |

Determine the design ultimate load moments for the beam shown in the figure, using also the following information.

- (i) Dead load from the parapet wall can be taken as a line load of  $2.0 \text{ kN/m}$ .
- (ii) Allowance for finishes on the slab can be taken as  $1.0 \text{ kN/m}^2$ .
- (iii) Imposed load on slab should be taken as  $4.0 \text{ kN/m}^2$ .
- (iv) Density of reinforced concrete =  $24 \text{ kN/m}^3$ .



**Extra notes:**

**External Evaluator**