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**FACULTY OF ENGINEERING**

**CIVIL ENGINEERING DEPARTMENT**

**COURSE OUTLINE**

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| **Course Unit Title** |  REINFORCED CONCRETE BUILDING DESIGN FUNDAMENTALS & DETAILS |
| **Course Unit Code** | CE 546 |
| **Type of Course Unit** |  Master course |
| **Level of Course Unit** |  1 |
| **National Credits** | 3 |
| **Number of ECTS Credits Allocated** | 8 |
| **Theoretical (hour/week)** |  3 |
| **Practice (hour/week)** |  - |
| **Laboratory (hour/week)** |  - |
| **Year of Study** |  5 |
| **Semester when the course unit is delivered** |  1 |
| **Course Coordinator** | Kabir Sadeghi |
| **Name of Lecturer (s)** | Kabir Sadeghi |
| **Name of Assistant (s)** | - |
| **Mode of Delivery** | Face to Face; Formal Lectures |
| **Language of Instruction** | English |
| **Prerequisites and co-requisites** | Undergraduate courses |
| **Recommended Optional Programme Components** | Background of statics, strength of materials, structural analysis and reinforced concrete structures design |
| **Objectives of the Course:** The main objectives of this course are to engage students in the discovery of reinforced concrete elements and structures design principles and to provide them with theory and applications in a clear, understandable presentation. |
| **Learning Outcomes** |
| **When this course has been completed the student should be able to** | **Assessment** |
| 1 | A Get familiar and understand conceptually topics of reinforced concrete buildings design. | 1, 2, 5 |
| 2 | Apply the methods of solving reinforced concrete buildings design problems that leads to the first insights into the rudiments of related fields in structural engineering sciences. | 1, 2, 3 |
| 3 | Analyze the reinforced concrete buildings design problems in two dimensions and three dimensions according to acceptable rules, regulation and ACI structural codes. | 1, 2, 3 |
| 4 | Apply the different methods of reinforced concrete buildings design due to applied loads. | 1, 2, 3 |
| 5 | Apply and integrate the basic reinforced concrete buildings design including different types of beams, columns slabs, material properties and the principles of engineering sciences into working practical knowledge. | 1, 2, 3, 5 |
| Assessment Methods: 1. Written Exam 2. Assignment 3. Project/Report 4.Presentation 5. Lab. Work |
| **Course’s Contribution to Program** |
|  |  | **CL** |
| 1 |  Ability to relate and apply fundamental sciences to learning the essential civil engineering concepts and theories of different branches. | 4 |
| 2 | Ability to understand the derivation of these concepts and theories by relating them to the real-life engineering cases within the related civil engineering branch. | 4  |
| 3 | Ability to define clearly and analyze the engineering problems by applying the introduced civil engineering concepts and theories of the related branch.  | 4  |
| 4 | Ability to use decision-making skills and perform design calculations correctly for the solution of the defined problem/project by applying the introduced theories of the related civil engineering branch. |  4 |
| 5 | Ability to understand and carry out the practical applications of learned civil engineering concepts and theories on site and/or laboratory.  |  5  |
| 6 | Ability to use software packages for the analysis and/or the design of the defined civil engineering problems/projects. | 3  |
| 7 | Ability to manage time and resources effectively and efficiently while carrying out civil engineering projects. | 4 |
| 8 | Ability to participate in team-works in a harmonized manner for the solution of the targeted problem. |  5  |
| 9 | Ability to write technical reports and/or to carry out presentations on the studied engineering project using the modern techniques and facilities. |  5  |
|  10 | Ability to carry out and finalize a civil engineering study/project by showing professional ethics. |  5 |
| CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5:Very High) |

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| **Course Contents** |
| **Week** | **Chapter** |  | **Exams** |
| 1 | Chapters 1 to 10 | Review of Fundamentals of Statically analysis of buildings and Reinforced Concrete Structures Design(Design of beams under Flexure and shear force)  |  |
| 2 | Chapters 1 to 10 | Review of Fundamentals of Statically analysis of buildings and Reinforced Concrete Structures Design (Design of beams under Flexure and shear force)  |  |
| 3 | Chapter 11  | Flexure and Shear (Design of Two-Way Slabs by using WSD method) |  |
| 4 | Chapter 11  | Flexure and Shear (Design of Two-Way Slabs by using USD method) |  |
| 5 | Chapter 12 | Flexure and Shear (Design of Two-Way Slabs by using USD method) |  |
| 6 | Chapter 13 | Design of continuous beams under Flexure and shear force (using USD method) |  |
| 7 | Chapter 13 | Design of continuous beams under Flexure and shear force (using USD method) |  |
| 8 | Chapter 14 | Design of Short Reinforced Concrete Columns under Uniaxial Bending Moment and Axial Load by using USD method | Midterm |
| 9 | Chapter 15 | Design of Short Reinforced Concrete Columns under Biaxial Bending Moment and Axial Load by using USD method) |  |
| 10 | Chapter 15 | Design of Short Reinforced Concrete Columns under Biaxial Bending Moment and Axial Load by using USD method) |  |
| 11 | Chapter 18 | Flexure and Shear (Design of Footings by using WSD and USD methods) |  |
| 12 | Chapter 18 | Flexure and Shear (Design of Footings by using WSD and USD methods) |  |
| 13 | Chapter 18 | Flexure and Shear (Design of Footings by using WSD and USD methods) |  |
| 14 | Chapter 19 | Concept of retaining wall design |  |
| 15 |  |  | Final |
| **Recommended Sources****Textbook:**  1. Reinforced Concrete Structures Design, 2nd Edition, By; Kabir Sadeghi, Near East University Press Centre, 2015. **Supplementary Material (s**):  2. Design of Concrete Structures, George Winter, Arthur H. Nilson, Published by McGraw Hill Book Company, 13th Edition, 2008.  3. Reinforced Concrete Design, Noel J. Everard and John L. Tanner III, Schaum’s Outline Series, Published by McGraw Hill Book Company, Latest Edition.  4. Fundamentals of Reinforced Concrete Design, M.L. Gambhir, Published by PHI Learning Private Limited Book Company, 2011.  5. Design of Reinforced Concrete, Mc.Cormac and Brown, 8th edition,  6. ACI Building Code Requirements and Commentary for Reinforced Concrete (ACI 318-11). 7. Foundation Analysis and Design, Joseph E. Bowles, Published by McGraw Hill Book Company, 1982.8. Pile Design &Construction Practice, by: Tamlinson M. J Published by Viewpoint Publication. |  | **Final Examination** |
| **Assessment** |
| Attendance& Assignment | 10% |  (5% attendance, 5% lecture notes) |
| Midterm Exam (Written) | 25% |  |
| Projects | 20% |  |
| Final Exam (Written) | 45% |  |
| Total | 100% |  |
| **ECTS Allocated Based on the Student Workload** |
| **Activities** | **Number** | **Duration****(hour)** | **Total****Workload(hour)** |
| Course duration in class (including the Exam week) | 15 | 4 | 60 |
| Tutorials | 3 | 2 | 6 |
| Assignments | 4 | 4 | 16 |
| Project/Presentation/Report Writing | 3 | 12 | 36 |
| E-learning Activities | 5 | 3 | 15 |
| Quizzes | - | - | - |
| Midterm Examination | 1 | 30 | 30 |
| Final Examination | 1 | 35 | 35 |
| Self-Study | 14 | 3 | 42 |
| Total Workload | 236 |
| Total Workload/30 (h) | 7.87 |
| ECTS Credit of the Course | 8 |