



**HASAN KALYONCU UNIVERSITY**  
**Faculty of Engineering**  
**Course Description Form**

|   |  |                         |                  |               |             |
|---|--|-------------------------|------------------|---------------|-------------|
| <b>COURSE:</b> Reinforced Concrete I                |  |                         |                  |               |             |
| <b>CODE:</b> CE351                                  |  | <b>SEMESTER:</b> FALL   |                  |               |             |
| <b>LANGUAGE:</b> ENGLISH                            |  | <b>TYPE:</b> COMPULSORY |                  |               |             |
| <b>PRE-REQUISITES: -</b><br><b>CO-REQUISITES: -</b> |  | <b>THEORY</b>           | <b>PRACTICAL</b> | <b>CREDIT</b> | <b>ECTS</b> |
| <b>WEEKLY HOURS:</b> 4                              |  | 4                       | 0                | 4             | 5           |

**CONTENT OF THE COURSE:**

This course gives the basic principles for reinforced concrete design of structures based on mechanical properties of structural concrete. Fundamentals and design theories based on ultimate (Limit) strength design and elastic concept. Introduction to Turkish Standard for Reinforced Concrete Design ‘TS-500’, Building Codes and the American Concrete Institute Code ACI. Load factors, structural safety limits. Analysis and design of reinforced concrete members subjected to flexure, shear and diagonal tension in accordance to ACI strength method. Development length of reinforcement.

**OBJECTIVE OF THE COURSE:**

To enable students to understand the fundamentals of reinforced concrete design theory for the major R. C. elements of ordinary buildings.

**WEEKLY SCHEDULE AND PRE-STUDY PAGES**

| <b>Week</b> | <b>Topics</b>   |
|-------------|---|
| 1           | Chapter A: Introduction & Material Properties of Concrete   |
| 2           | Chapter A: Introduction & Material Properties of Concrete   |
| 3           | Chapter B: Flexural Analysis of Beams                       |
| 4           | Chapter C: Strength Analysis of Beams According to ACI Code |
| 5           | Chapter C: Strength Analysis of Beams According to ACI Code |
| 6           | Chapter D: Design of Rectangular Beams                      |
| 7           | Chapter D: Design of Rectangular Beams                      |
| 8           | Midterm Week  |
| 9           | Chapter E: Analysis and Design of T, L Beams                |
| 10          | Chapter E: Analysis and Design of T, L Beams                |
| 11          | Chapter F: Bond and Development Length                      |
| 12          | Chapter F: Bond and Development Length                      |
| 13          | Chapter G: Shear and Diagonal Tension                       |
| 14          | Chapter G: Shear and Diagonal Tension                       |

- **TEXTBOOK:** Jack McCormac, Russell Brown, “Design of Reinforced Concrete”, 10th Edition, John Wiley & Sons, 2015.

**REFERENCE BOOKS**

- James K. Wight, F.E. Richart, Jr., James G. Macgregor, “Reinforced Concrete,

**Mechanics and Design”, 6<sup>th</sup> Edition, Pearson, 2012.**

- **A.H. Nilson, D. Darwin, C.W. Dolan, “Design of Concrete Structures”, 14th Ed McGraw-Hill, 2010.**
- **W.H. Mosley, R. Hulse and J.H Bungey, “Reinforced Concrete Design to Eurocode 2”, 7<sup>th</sup> Edition, Palgrave Macmillan, 2012.**
- ACI 318-14, “Building Code Requirements for Structural Concrete and Commentary”, American Concrete Institute, 2014.
- TS 500, “Requirements for Design and Construction of Reinforced Concrete Structures”, Turkish Standards, 2000.

EN 1992-1-1: 2004 (E), “Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings”, European Standard, CEN, 2004.

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| <b>LO1</b>   | 0   | 3   | 3   | 2   | 3   | 0   | 0   | 0   | 0   | 0    | 0    |
| <b>LO2</b>   | 0   | 3   | 3   | 1   | 3   | 0   | 0   | 0   | 0   | 0    | 0    |
| <b>LO3</b>   | 0   | 3   | 3   | 1   | 3   | 0   | 0   | 0   | 0   | 0    | 0    |
| <b>LO4</b>   | 0   | 3   | 3   | 2   | 3   | 0   | 0   | 0   | 0   | 0    | 0    |
| PO: Program Outcomes   LO: Learning Outcomes<br>Values: 0: None   1: Low   2: Medium   3: High |     |     |     |     |     |     |     |     |     |      |      |

|                               |                               |
|-------------------------------|-------------------------------|
| <b>INSTRUCTOR(S):</b>         | Assoc. Prof. Dr. Amjad Khabaz |
| <b>FORM PREPARATION DATE:</b> | 22.05.2019                    |

**LEARNING OUTCOMES OF THE COURSE:**

**LO1:** To understand different elements of R. C. in buildings (Excluding high-rise buildings)

**LO2:** To determine the different loads on each element and design it

**LO3:** To Select appropriate methods of analysis studied in the theory of structures relevant to reinforced concrete buildings

**LO4:** To choose appropriate material properties studied in the Strength of Materials course and relevant to reinforced concrete buildings

**CONTRIBUTION OF THE COURSE TOWARDS PROVIDING VOCATIONAL**

**EDUCATION:** The student learns about reinforced concrete structures and the standards concerning these structures and designs column beams using these standards.