REINFORCED CONCRETE DESIGN 1

Course Information

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REINFORCED CONCRETE DESIGN 1

- SUBJECT CODE : BAA2213
- CREDIT HOURS : 3
- CONTACT HOURS : 3
- PRE-REQUISITE : THEORY OF STRUCTURE (BAA2113)

Synopsis

This course covers:

1. The introduction of reinforced concrete design, the limit state principles, ultimate strength analysis and flexural design.
2. Shear, bond and torsion, analysis and design of beams and solid slab, staircases and introduction to axial column design.
3. Using codes require for design and detailing.
4. The group design project for double storey house.

Course Outcome

By the end of this course , students will have the ability to:

1. Analyse first principle for single and double reinforced concrete beam and design reinforced concrete beam in accordance to the relevant codes of practice in building design.
2. Analyse, design and detail reinforced concrete slab in accordance to the relevant codes of practice in building design.
3. Analyse, design and detail reinforced concrete staircase in accordance to the relevant codes of practice in building design.

Course Outcome

By the end of this course , students will have the ability to:

4. Analyse, design and detail reinforced concrete non-slender column in accordance to the relevant codes of practice in building design.
5. Design project of a double storey house in group as project team work and apply relevant code of practice, manuals and software in the design and detailing of structural components in reinforced concrete structures.

Course Content

- Topic 1 : Introduction to Reinforced Concrete Design
- Topic 2: Analysis and Design of Section
- Topic 3: Shear
- Topic 4: Deflection, Cracking and Detailing
- Topic 5: Design of Beam
- Topic 6: Design of Slab
- Topic 7: Design of Staircase
- Topic 8: Design of Column

Topic 1 : Introduction to Reinforced Concrete Design

i. Reinforced concrete materials
ii. Limit state design
iii. Characteristic load and strength
iv. Partial safety factor
v. Code of practice
vi. Properties of concrete and steel

Topic 2: Analysis and Design of Section

i. Stress-strain distribution
ii. Types of failure
iii. Singly reinforced rectangular section
iv. Doubly reinforced rectangular section
v. Flanged section
vi. Design procedure

Topic 3: Shear

i. Types of shear reinforcement

ii. Design procedure

Topic 4: Deflection, Cracking and Detailing

i. Deflection - span to depth ratio, modification factors

ii. Cracking - types of cracking, bar spacing

iii. Detailing - concrete cover, minimum and maximum areas of reinforcement, anchorage, curtailment and lapping

Topic 5: Design of Beam

i. Beam sizing
ii. Simply supported and continuous beam
iii. Distribution loading of slab to beam
iv. Loading arrangement on beam and method of analysis
v. Moment distribution

Topic 6: Design of Slab

i. Classification of solid slab
ii. Analysis and design of one-way slab
iii. Slab detailing of one-way slab
iv. Analysis and design of two-way slab
v. Slab detailing of two-way slab

Topic 7: Design of Staircase

i. Introduction to staircase
ii. Classification of staircase
iii. Staircase design
iv. Staircase Detailing

Topic 8: Design of Column

i. Classification of column
ii. Effective height
iii. Axial Load & Bending moment in Column
iv. Short column design
v. Column detailing

References

1. M. Salleh Yassin. Reinforced Concrete Design to Eurocode , 2012
2. W.H. Mosley,J.H. Bungeyand R. Hulse, Reinforced Concrete Design to Eurocode, 6th Edition, Palgrave 2007
3. Chanakya Arya, Design of Structural Elements, Third Edition, 2009
4. BS EN 1990 : 2002 - Eurocode : Basis of Structural Design
5. BS EN 1991-1-1 : 2002- Eurocode 1 : Actions on structures (densities, selfweight, imposed loads for buildings)
6. BS EN 1992-1-1 : 2004- Eurocode 2 : Design of concrete structures
7. Uniform Building By-Laws 1984, Law of Malaysia, 15th December 2008

Lecturer Information (Authors)

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