EXPANDED COURSE DESCRIPTION
CIVIL ENGINEERING
Lassonde School of Engineering
Civil Engineering
LE / CIVL 4002 3.0 SECTION A
REINFORCED CONCRETE DESIGN
FALL 2017 / WINTER 2018

Last Modified Date: 08/17/2017

COURSE CALENDAR DESCRIPTION
Design of reinforced concrete members based on serviceability and ultimate limit states. Design for combined shear and torsion. Review of one-way slabs and introduction to two-way slab systems. Design of two-way slabs using strip method, direct design method, and equivalent frame method. Punching of flat slabs, detailing of drop panels and capitals. Design of axial members subjected to axial load and uniaxial/biaxial bending. Slenderness effects. Non-sway and sway columns. Design of foundations subjected to axial and bending stresses. Introduction to walls, and design of bearing walls. Prerequisites: LE/CIVL 3230 3.00; LE/CIVL 3130 3.00

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Palermo, Daniele</td>
<td>Sec. A / LECT / F</td>
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SPECIAL FEATURES
The objective of this course is for students to first enforce and then expand their knowledge in design of reinforced concrete structures using principles established previously in CIVL 3230 Introduction of Structural Design. The components of this course includes:

- Principles of Limit States Design according to the National Building Code (NBC) of Canada
- Design of reinforced concrete components following requirements of Canadian Standards Association (CSA) Standard A23.3 Design of Concrete Structures
- Design of reinforced concrete members at the sectional level due to combined actions, and design for global stability effects

ENGINEERING DESIGN/ENGINEERING SCIENCE
Students will be exposed to the design process for reinforced concrete according to the requirements of the National Building Code of Canada (NBC) and Canadian Standards Association Standard A23.3 Design of Concrete Structures. Weekly assignments will cover behavior and design-related problems.

TOPICS AND CONCEPTS
Schedule of Topics:
Week 1: Course introduction, review of Limit States Design principles including serviceability and ultimate limit states
Week 2: Review of one-way slabs and introduction to two-way systems
Week 3: Strip Method for two-way slabs
Week 3: Direct Design Method for two-way slabs
Week 4: Elastic Frame Method for two-way slabs
Week 5: Design of two-way slabs on stiff supports
Week 6: Punching of flat, two-way slabs, and detailing of drop panels and column capitals
Week 7: Design of reinforced concrete beams for combined shear and torsion
Week 8: Design of columns for combined axial load and uniaxial bending, and axial load and biaxial bending
Week 9: Design of columns for slenderness effects, non-sway columns
Week 10: Design of columns for slenderness effects, sway columns
Week 11: Design of foundations for axial and bending stresses
Week 12: Introduction to walls and design of bearing walls

Schedule of Tutorials/Assignments:

The weekly tutorials and assignments will follow the content presented during the lectures.

LIST OF LEARNING OUTCOMES AND EXAMPLES OF COURSE LEARNING OBJECTIVES

At the completion of this course, students should:

- Have an understanding of the mechanical properties of reinforced concrete
- Have the knowledge to design reinforced concrete members following Limit States Design Principles, including serviceability and ultimate limit states requirements
- Be able to perform sectional design of reinforced concrete members subjected to combined actions, including: shear and torsion, and axial load and uniaxial or biaxial bending
- Have an understanding of the behavior and design methods for one-way and two-way floor systems subjected to gravity loads
- Understand and be able to incorporate member effects (slenderness, sway, ) into the design of gravity load-carrying components
- Be able to design simple foundations for gravity load effects

COURSE LEARNING OUTCOMES

1. Apply the principles of Limit States Design to reinforced concrete structures
2. Perform sectional design of reinforced concrete members subjected to combined load effects according to Canadian Standards Association Standard A23.3 Design of Concrete Structures
3. Select the most appropriate design procedure for slab systems
4. Assess the load carrying capacity of flat plate slab systems
5. Incorporate global effects into the design of gravity load-carrying members
6. Understand and design foundations for gravity load effects

GRADED ASSESSMENT

Mark Breakdown:

Assignments: 10%
Mid Term Examination: 30%
Final Examination: 60%

ADDITIONAL INFORMATION

Required:
Suggested Readings:

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
  • Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
  • Counselling and Disability Services - http://cds.info.yorku.ca/

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.
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