EXPANDED COURSE DESCRIPTION
CIVIL ENGINEERING
Lassonde School of Engineering
Civil Engineering
LE / CIVL 2120 3.0 SECTION A
CIVIL ENGINEERING MATERIALS
FALL 2017 / WINTER 2018

Last Modified Date: 08/17/2017

COURSE CALENDAR DESCRIPTION

Chemical, physical and mechanical properties of common civil engineering materials, such as Portland cement, Portland cement concrete, metals and alloys, wood, asphalt, asphalt concrete, masonry, and polymer composites; phenomenological basis for the properties of these materials; introduction to material characterization and quality control. Prerequisites: SC/CHEM 1100 4.00.

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
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<tr>
<td>Palermo, Daniele</td>
<td>Sec. A / LECT / F</td>
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TOPICS AND CONCEPTS

The main objective of this course is for students to become familiar with materials commonly used in civil engineering construction applications, including an understanding of the physical, chemical and mechanical properties. The components of this course cover:

- Basic mechanical properties of materials such as stress and strain response
- The performance of various materials when subjected to loading
- Durability of various materials and how this impacts the decision-making process in engineering applications
- Design of Portland cement concrete and asphalt concrete mixes according to standard specifications
- Laboratory testing of materials according to standard procedures to establish physical and mechanical properties typically used in design
- Technical report writing based on the laboratory test observations and results

Schedule of Topics:

- Week 1: Course introduction and mechanical properties of materials
- Week 2-6: Concrete – aggregates, Portland cement, properties of fresh concrete, mix proportioning, admixtures, mixing, placing and curing of concrete, properties of hardened concrete
- Week 7: Metals and alloys – production, types of metals, properties
- Week 8-9: Asphalt – bituminous materials, properties, asphalt grades, asphalt concrete mix designs
- Week 10: Wood – structure, properties, grades, engineered wood products
- Week 11: Masonry – masonry units, mortar, and grout; Advanced composite materials –components, properties, applications
- Week 12: Introduction to emerging materials; Review of course material

Schedule of Laboratories:

- Lab 1: Aggregate sieve analysis
- Lab 2: Specific Gravity and Absorption of Fine Aggregates
- Lab 3: Trial mix concrete batching and casting of concrete cylinders
- Lab 4: 7-day concrete cylinder compression test
- Lab 5: 14-day concrete cylinder compression test
- Lab 6: 21-day concrete cylinder compression test
• Lab 7: 28-day concrete cylinder compression test
• Lab 8: Metal coupon tension tests
• Lab 9: Wood testing

LIST OF LEARNING OUTCOMES AND EXAMPLES OF COURSE LEARNING OBJECTIVES

At the completion of this course, students should:

• Be familiar with civil engineering materials commonly used for construction applications
• Understand the physical, chemical and mechanical properties of various civil engineering materials
• Understand the production and composition of common civil engineering materials
• Understand and appreciate the applications for common civil engineering materials
• Be able to calculate stresses and strains experienced by materials due to mechanical loading
• Have the knowledge to extend how the mechanical behaviors and durability performances of materials impact the decision-making process in engineering applications
• Have the tools to design Portland cement concrete and asphalt concrete mixes according to standard specifications
• Be aware of safety rules and procedures in material testing laboratories
• Gain experiential learning from testing procedures of the mechanical behavior of various civil engineering materials subjected to loading
• Gain experiential learning from the process involved in batching trial concrete mixes; and mixing, casting, and curing of concrete
• Gain communication skills through preparing technical laboratory reports

COURSE LEARNING OUTCOMES

1. Understand the physical, chemical and mechanical properties of various civil engineering materials
2. Understand and calculate stresses and strains experienced by various materials due to loads
3. Design Portland cement concrete and asphalt concrete mixes according to standard specifications
4. Prepare, batch, mix and cast Portland cement concrete mixes
5. Interpret laboratory data from basic testing of civil engineering materials
6. Prepare a professional laboratory report including engineering charts, tables, graphs, and diagrams to present information effectively

GRADED ASSESSMENT

Mark Breakdown:

Quizzes – 5%
Lab Reports – 25%
Midterm Examination – 25%
Final Examination – 45%

ADDITIONAL INFORMATION

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
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.

Moodle @ York University