



CIVE 556 - Sustainability and Advanced Concrete Technology

Term – Summer 2019 (201905)

Instructor	Office Hours
Dr. Rishi Gupta	Days: Posted outside office
Phone: 250-721-7033	Time: Posted outside office
E-mail: guptar@uvic.ca	Location: ECS 314

List all prerequisites and co-requisites: 220, 285, 352

LECTURE DATE(S)

Section: A 01 /CRN30127	Days: T, F	Time: 9:30-10:50	Location: ECS 130

TUTORIAL SECTIONS

Section: T	Days:	Time:	Location:

LAB SECTIONS

Section: B (Multiple)	Days:	Time:	Location:
Insert additional rows if required	(or leave blank and state how/when labs will be scheduled)		
All labs (TBC)	Wednesday	8:30-11:20am	CIVE Materials Facility

Lab times and locations are also available from the [timetable](#) through Sign in to UVic, My Page.

TA Name	E-mail	Office
Ahmad Sepheri	sephriahmad@gmail.com	CARSA

Required Text	Optional Text
Title: Concrete (<i>Check possible course pack in the bookstore</i>)	Properties of Concrete
Author: Sidney Mindess, J. Francis Young, David Darwin	Neville, A.M.
Publisher/Year: Upper Saddle River, NJ : Prentice Hall, c2003.	Prentice Hall; 5 edition
Reference Materials: American Concrete Institute's publications	

COURSE OBJECTIVES:

This course is focused on advanced cement-based composites, emerging materials, and green materials. Material properties are evaluated using conventional and innovative non-destructive evaluation methods. Brief course description: Microstructure of hydration products and its effect on properties of concrete. Mechanisms and interaction of chemical admixtures and industrial wastes to produce sustainable and high performance concrete. Evaluation of fresh and hardened properties of conventional and cement-based composites. The course will include a project component focusing on specialized concretes and emerging materials not limited to Fiber Reinforced Concrete, Self-consolidating concrete, High Strength Composites, Light Weight Concrete, and Carbon Negative Concrete.

LEARNING OUTCOMES:

Describe microstructure of hydrated cement

Explain the relationship between hydration products and resulting properties of concrete

Explain mechanisms behind functioning of chemical admixtures and supplementary cementing materials

Evaluate fresh and hardened properties of cement-based composites

Design an emerging material or specialized concrete mix

Evaluate properties of designed mix using traditional and non-destructive evaluation techniques

Weight & Date(s) of Assessments:	Weight	Date
Assignments:	10%	TBA
Mid-term 1	25%	TBA
Mid-term 2	30%	TBA
Mid-term 3	15%	TBA
Project	20%	TBA

ASSIGNMENTS:

Students will be required to complete four assignments in this course. Details and submission dates will be confirmed in class.

Assignment #	Modules	Start	Due (5 pm)
1	Hydration of Portland Cement		
2	Eco Concretes and Admixtures		
3	Construction practices and Stress response		
4	Fresh/Hardened properties and durability		

LABORATORIES:

The laboratory sessions are mandatory for students to attend. The lab sessions are meant to facilitate student projects. Students will be required to come to the Civil Engineering Materials Facility during the scheduled lab time only. Students required to bring PPE with them for ALL labs.

Lab #	Modules (Tentative)	Start	Due (5 pm)
1	Lab orientation, safety training, training on using lab equipment: for preparing conventional concrete		
2	Mix Design exercise, group formation, training on using lab equipment: various destructive tests		
3	Groups design and cast specimens using specialized concretes, training on using lab equipment: various NDTs		
4	Designing custom test set-up by students for destructive and NDTs		
5	Specimen curing and prep for destructive and NDTs		

PROJECTS:

Further details about the group projects will be given to students in class.

NOTE:

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

COURSE LECTURE NOTES

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

There will be no supplemental examination for this course.

GENERAL INFORMATION

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Attendance

Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time...

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or

failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course." UVic Calendar, (2017-2018) <http://web.uvic.ca/calendar/undergrad/info/regulations/attendance.html>

Accommodation of Religious Observance

The University recognizes its obligation to make reasonable

accommodation for students whose observance of holy days might conflict with the academic requirements of a course or program.

Students are permitted to absent themselves from classes, seminars or workshops for the purposes of religious or spiritual observance.

In the case of compulsory classes or course events, students will normally be required to provide reasonable notice to their instructors of their intended absence from the class or event for reasons of religious or spiritual observance. In consultation with the student, the instructor will determine an appropriate means of accommodation. The instructor may choose to reschedule classes or provide individual assistance.

Where a student's participation in a class event is subject to grading, every reasonable effort will be made to allow the student to make up for the missed class through alternative assignments or in subsequent classes.

Students who require a rescheduled examination must give reasonable notice to their instructors. If a final exam cannot be rescheduled within the regular exam period, students may request an academic concession.

To avoid scheduling conflicts, instructors are encouraged to consider the timing of holy days when scheduling class events.

For further information, including a list of days of religious observances, please contact the Equity and Human Rights Office or visit their website: web.uvic.ca/eqhr

Discrimination and Harassment Policy (GV0205)

<http://web.uvic.ca/calendar/general/policies.html>

Standards for Professional Behaviour

"It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals...."

You are advised to read the Faculty of Engineering Document [Standards for Professional Behaviour](#) which

contains important information regarding conduct in courses, labs, and in the general use of facilities.

<https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

Policy on Academic Integrity

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar

<http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html> for the UVic policy on academic integrity.

Equality

This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members."

Tentative Lecture & Lab Schedule

Lecture (wk of)	Topics Covered	Labs / Tutorials / Assignments / Other	Important Due Dates
Monday, May 6	Course Intro, Review (Mix design & other aspects) Concrete Industry Intro, Cement physical and chemical properties Visit to AMF (presentation and demo)	Exercise on Mix-design, Assignment 1	TBC (WHMIS and lab safety training)
13	Cement Phys & chem prop & Microstructure of hydrated cement		
20 (Victoria Day)	Microscopy (flipped classroom) Eco-Concretes, Use of chemical admixtures	Assignment 2	Assignment 1
27	Introduction to specialized concretes (project- FRC, LWC, Carbon -ve Conc, Recycled concrete)	Project (form groups, select), ACI papers	
June 3	(Midterm 1)	Lab equipment facilities tour	Assignment 2
June 10	Construction Practices- Batching, mixing, transporting	Assign 3	
17**	<i>(Guest speaker- Geopolymer or BASF)</i> Properties of hardened concrete Lok test demo	Lab Visit: specifics on test machines	Assignment 3
24	Fresh Property Tests & Project Progress UPV demo	Assign 4, Possible demo on half cell	
July 1 (Reading brk 1-2)	Midterm 2 , Standardized Strength Tests & Project Progress	Demo on NDTs (Schmidt, UPV, Resonant Frequency, resistivity, pullout)	
July 8	Environmental Issues, Other Properties, Durability Half-cell demo	Reading assign- MCP/Text on Shotcrete and Cement Polymer Comp	Assignment 4
15	Non-destructive Testing of Concrete Structures Repair method demo		
22	Midterm 3 & Specialized conc (shotcrete & cement polymer composites- in class)		Final Project

Lecture (wk of)	Topics Covered	Labs / Tutorials / Assignments / Other	Important Due Dates
29 (Aug 2 nd last day)	Group Presentations, Last day of classes Pop quiz		

** possible guest lectures