CAMOSUN COLLEGE
School Of Trades and Technology
Department of Civil Engineering Technology
CIVE262-Soils and Materials 2
2018 Winter

COURSE OUTLINE

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1 Instructor Information

Instructor	Bao-Qin Bai		
Office hours	As Posted		
Location	Tech 114		
Phone	250-370-4442	**Alternative:**	
E-mail	bai@camosun.bc.ca		
Website	http://civil.camosun.bc.ca/student/		

2 Prerequisites and Corequisites

CIVE 261

3 Hours and Credits

Course Activity	Hours / Week	Instruction – No of Weeks *(Q=11; S=14; "P or S" = 7)*
☒ **Lecture (Direct Instruction)**	5	14
☐ **Seminar (Direct Instruction)**		
☒ **Lab /Collaborative Learning**	3	14
☐ **Supervised Field Practice**		
☐ **Workplace Integrated Learning** *(Coop, Internship, etc.)*		
☐ **Other*(*please note*):**		

Credits = 4

4 Short Description

Continuing from CIVE 261, students will be introduced to the theory and application of soils consolidation and shear strength. Students will learn the basic concepts and principles of the construction materials of aggregates, Portland cement concrete, asphalt binders and mixes, including the design, batching, and testing of Portland cement concrete and the design and testing of asphalt mixes. Typical standard tests on soils, aggregate, Portland cement concrete, and asphalt mixes are performed.

5 Intended Learning Outcomes

Upon successful completion of this course, students will be able to:

- Conduct one-dimensional consolidation test and direct shear test; analyze the test results.
- Calculate settlement due to primary consolidation.

- Sample aggregates in normal field settings (i.e. pits, truckloads, conical piles, etc.).
- Describe the general process of aggregate production and appropriate methods of stockpiling and handling.
- Explain the concepts and testing methods of aggregate cleanliness, toughness, and durability.
- List the principal composition of the raw materials used for the production of Portland cement.
- Describe the characteristics of the main compounds, the physical properties and tests of Portland cement.
- Describe the five major types of Portland cement.
- Describe the requirements for the major component materials and typical admixtures in Portland cement concrete.
- Describe the differences between entrained and entrapped air in Portland cement concrete.
- Design Portland cement concrete mix using the absolute volume method.
- Describe the concepts of deformation and durability of hardened Portland cement concrete.
- Describe classification, production, composition, and their basic properties of asphalt binders and asphalt mixes.
- Design asphalt mixes according to Marshall method.
- Describe how the basic asphalt mix properties influence the behaviors of asphalt pavement.
- Grade asphalt binders using the Canadian General Standards Board and the Superpave grading systems; describe the basic testing methods used in the gradings.
- Test the properties and analyze their test results for aggregate, plastic and hardened Portland cement concrete, and asphalt mix.

6 Course Content and Schedule

Lecture: Tec 173 Mon. 9:30 - 11:50 Tec 110, Tue. 2:30-4:50
Lab: Tec 127 X01A: Thu. 9:30-12:20 X01B: Wed. 1:30 - 4:20 X01C: Fri. 10:30 - 1:20

Course Content (This Course Content is subject to change without further notification.)

Week	Lecture Topics	Lab Topics
1	* SOIL CONSOLIDATION & SETTLEMENT: Consolidation test;	
2	Settlement;	1. One-D Consolidation Test
3	* SOIL SHEAR STRENGTH: Direct shear test; Triaxial test; Mohr-Coulomb failure criterion;	1. One-D Consolidation Test
4	**Quiz 1** (Week 4); Shear strength test result analysis; Field testing	1. One-D Consolidation Test
5	Shear strength test result analysis; Field testing	2. Direct Shear Test
6	Reading Break	
7	* AGGREGATE: Properties; Classification; Aggregate production; stock piling; sampling	3. Coarse Aggregate
8	**Quiz 2**; * PORTLAND CEMENT * CONCRETE: Concrete mix design	4. Coarse and Fine Aggregate
9	Concrete ingredients; Freshly mixed concrete; Hardened concrete;	5. Concrete Batching and Testing
10	* Hardened concrete; Admixtures; Inspection * Asphalt: Introduction; composition; properties & tests; grading;	6. Compressive strength test (7 d)
11	**Quiz 3**; ASPHALT MIX: Properties; design; Field trip to a concrete batch plant;	6. Compressive strength test (14 d)
12	* design; asphalt mix production; inspection	7. Marshall specimens
13	* Introduction to Superpave Grading System * Field trip to an asphalt mix plant	7. Marshall test; 6. Compressive strength test (28 d)
14	**Quiz 4**; * Review	

15	Final Exam	

Note: Each quiz always covers the course materials up to the week that is one week before the quiz test.
Week 6: Feb 12-16, Reading Break; Week 12: Mar 30, Good Friday; Week 13: Apr 2, Easter Monday;

7 Basis of Student Assessment

Component	Weighting	Comments
Quizzes	20%	Written, closed book with review sheets*
Labs	21%	
Field trips	4%	To a concrete batch plant and an asphalt mix plant
Instructors Assessment	5%	
Final Exams	50%	Written, closed book with review sheets*
TOTAL	100%	

* The review sheets include printed PP presentations and all hand-written notes by yourself on A-sized paper (8.5x11").

8 Recommended Materials to Assist Students to Succeed Throughout the Course

a. A pair of steel-toed boots that are needed for labs and field trips
b. References:
   * Essentials of Soil Mechanics and Foundations, D.F. McCarthy, Prentice Hall
   * Lab Manual (Please print from K drive)
   * H.K. Steven et al., Design and Control of Concrete Mixtures, Cement Association of Canada
   * Asphalt Institute, Principles of Construction of Hot Mix Asphalt Pavement, Asphalt Institute, Manual Series No.22 (MS-22).

9 College Supports, Services and Policies

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies
Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

10 Grading System

☒ *Standard Grading System (GPA)*
☐ *Competency Based Grading System*

See Camosun Grading Policy E-1.5

11 Class Policies

A weighted average of 50% on all tests/examinations and a 50% on the final examination must be attained in order to pass this course. Mark deduction for late submission of any lab report/assignment is 10% of that lab report/assignment. If it is handed in after the lab reports/assignments of the other students are returned to class, no mark will be given, but all the required lab reports/assignments must be submitted prior to final examination in order to qualify for writing the final exam. If a lab session is missed, a mark of zero will be assigned for that lab session. If your lab report is required to redo and rehand in, your maximum mark for that report will be the minimum mark of the class minus 10%.