ECE 325 Object-Oriented Software Design

Fall 2022 - September 01 to December 08

Class time: Monday, Wednesday, Friday 9:00-9:50 Location: NRE 1-001

Instructor:

Cor-Paul Bezemer, PhD, he/his

bezemer@ualberta.ca
DICE 11-324
Office Hours: Will be announced on eClass

Course Description:

*3.8 (fi 8) (either term, 3-0-3/2) Software engineering principles of object-oriented design: basic data structures, classes and objects, creation tactics, inheritance, composition, polymorphism, interfaces, compilation and execution. Programming Objectives: introduction to advanced data structures, inner classes, and reflection. Exception handling and unit testing.

Prerequisites: CMPUT 275.

Course synchronous and asynchronous content delivery schedule:

All components of the course will be delivered synchronously.

TA Information:

Chuan Guo (cguo2@ualberta.ca)
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Lab Sections:

Section	Day	Time	Location
LAB D31	Wednesday	14:00 - 16:50	ETLC E5005
LAB D32	Wednesday	14:00 - 16:50	
LAB D41	Thursday	14:00 - 16:50	ETLC E5005
LAB D42	Thursday	14:00 - 16:50	

Course Objectives & General Content:

The goals of this course are:
- To expose you to software development using object-oriented design.
- To expose you to elements of good programming style and methodology.

- To teach you the basics of Java programming.

Learning Outcomes:

By the end of this course, students should be able to:

1. Compare competing software quality objectives
2. Understand the complexity of equality in object-oriented programs
3. Compare and contrast inheritance, composition and part-of relationships.
4. Utilize basic class and object concepts.
5. Identify the role of inheritance, both good and bad, in modern construction
6. Build systems with the expectation that defects will exist.
7. Build systems which incorporate test cases as essential executable components
8. Design interface (abstract class)-based programs
9. Utilize more advanced data structures, such as red / black trees
10. Design programs where generic definitions are a key component
11. Design programs where actions are utilized as parameters.
12. Design programs with post-compile time features, such as reflection and annotations.

Marking Scheme:

Activity	(A)Synchronous	Due/Scheduled	Weight
5 course assignments @ 10% each		See schedule below	50%
5 lab assignments @ 10% each		See schedule below	50%

The Faculty recommended grade point average for a 300 level course is 3.0. Instructors have the leeway to deviate from this average and can assign grades based on their own scheme. All grades are approved by the department chair (or delegate). The office of the Dean has final oversight on all grades.

Term Work

All term work solutions will be posted no later than the last day of classes. All term work will be returned to students by the final day of classes, with the exception of major term work due in the last week of classes. The latter will be returned by the day of the final examination or the last day of the examination period if there is no final examination in the course as per university policy; instructors will make accommodations to return these term work. It is the responsibility of the student to pick up all their term work at the specified time and place. Any unreturned term work, shall be retained and then shredded six months after the deadline for reappraisal and grade appeals. Final examinations will be kept for one year as required by university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

Additional Notes

There will be 5 course assignments and 5 lab assignments, worth 10% each. All assignments are individual and asynchronous, and will have their own evaluation scheme. The deadlines can be found in the schedule below.

Your final grade will be based on a scale adjusted to the overall class performance. An example of a scale is:
[100%-90%] A+/A/A-
(90%-80%] B+/B/B-
(80%-70%] C+/C
(70%-60%] C
(60%-0%] F

There is no final exam or midterm for this course.

Late assignments policy (both for course and lab assignments):
- 15% penalty if submitted within 12 hours of the deadline
- 30% penalty if submitted within 12-48 hours of the deadline
- Not accepted after 48 hours after the deadline, unless approval is obtained from the instructor before the due date

Calculator Policy

There is no calculator policy in this course; students are free to use the calculator they wish for all assessments.

Text and References (Mandatory):

There is no mandatory textbook.

Text and References (Recommended):

Class notes and laboratory manuals will be provided by the instructor.
Recommendations of good software engineering books that are available in the UA library will be provided.

Website:

eClass

Did you know that the University of Alberta has various low-to-no-cost services to help students succeed? Visit http://www.deanofstudents.ualberta.ca/ for information about the academic, wellness, and various other support services available to U of A students. It's never too early or too late to seek help!

NB this is a tentative schedule. There will probably be some deviation from this schedule.					
Lect # / Lab # / Assignment #			**Date**		
	Week 1		Aug 29-Sep 2		
	LEC 1		Intro/syllabus		
	Week 2		Sep 5-Sep 9		
LAB 1					
	LEC 2		Intro OOP/Java		
	LEC 3		Java basics		
	Week 3		Sep 12-Sep 16		
	LEC 4		Classes vs. objects		
	LEC 5		Classes vs. objects		
	LEC 6		Arrays		
	Week 4		Sep 19-Sep 23		
LAB 2					
	LEC 7		Using the Java library		
	LEC 8		Using the Java library		
	LEC 9		Encapsulation, autoboxing		
	Week 5		Sep 26-Sep 30		
	LEC 10		Static keyword and constants		
	LEC 11		Inheritance		
Assignment 1 due					
	Week 6		Oct 3-Oct 7		
LAB 3					
	LEC 12		Inheritance		
	LEC 13		Inheritance		
	LEC 14		Inheritance		
	Week 7		Oct 10-Oct 14		
	LEC 15		Inheritance		
	LEC 16		Exception handling		
Assignment 2 due					
	Week 8		Oct 17-Oct 21		
LAB 4					
	LEC 17		Basic I/O		
	LEC 18		Basic I/O		
	LEC 19		Packages		
	Week 9		Oct 24-Oct 28		
	LEC 20		Java Collections		
	LEC 21		Comparable		
	LEC 22		Writing more readable code		
Assignment 3 due					
	Week 10		Oct 31-Nov 4		
LAB 5					
	LEC 23		Testing your code		

	LEC 24		Enum types		
	LEC 25		Regex		
	Week 11		Nov 7-Nov 11		
	(no lectures - reading week)				
	Week 12		Nov 14-Nov 18		
	LEC 26		Nested classes		
	LEC 27		Design principles (SOLID)		
	LEC 28		Refactoring		
Assignment 4 due					
	Week 13		Nov 21-Nov 25		
LAB 6					
	LEC 29		Refactoring		
	LEC 30		Application performance		
	LEC 31		Application performance		
	Week 14		Nov 28-Dec 2		
	LEC 32		Garbage collection		
	LEC 33		Functional programming		
	LEC 34		Packaging/releasing		
Assignment 5 due					
	Week 15		Dec 5-Dec 9		
			(no lecture)		

UNIVERSITY AND FACULTY POLICIES

COURSE OUTLINE POLICY

The policy about course outlines can be found in Course Requirements, Evaluation Procedures and Grading of the University Calendar, see https://calendar.ualberta.ca/

RESPECT AND PROFESSIONALISM

The Faculty of Engineering is committed to fostering and protecting an equitable, inclusive, and respectful work and study environment in line with University of Alberta policies and professional engineering industry standards. University is an opportunity for students to explore areas of interest and to potentially pursue a career in a specific field. The Faculty of Engineering prepares students to uphold industry standards to become a Professional Engineer (P. Eng). Respect, professionalism, and accountability must be upheld within the Faculty of Engineering.

Harassment and discrimination are serious issues that have a negative effect on culture and therefore the Student Code of Behaviour states that no student shall discriminate against or harass any person or group of persons. The Faculty expects an environment free of harassment, discrimination, and bullying. Please refer to the University's Discrimination, Harassment, and Duty to Accommodate Policy for definitions.

SAFETY DURING LEARNING ACTIVITIES

In all Faculty of Engineering courses, labs, seminars or other learning activities, safety is of paramount importance. In some cases, laboratory work in a program requires high standards for risk management to keep potential hazards safely under control. Anyone found to be unable to function safely, due to intoxication, harassment or discriminatory behaviour, or other reasons, in the class, lab, seminar or other learning activity may be asked to leave or be removed for their and the safety of other participants and instructors in alignment with the Student Code of Behaviour. As members, or prospective members, of the engineering profession, it is your responsibility to identify and inform the proper authorities of an unsafe work/learning environment.

AUDIO/VIDEO RECORDING

Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Only those items specifically authorized by the instructor may be brought into the exam facility. The use of unauthorized personal listening, communication, recording, photographic and/or computational devices is strictly prohibited. Students should refrain from bringing any unauthorized electronic device into an examination room, including cell phones, high tech watches, high tech glasses or other such devices.

ACADEMIC INTEGRITY

Students at the University of Alberta must read and follow, in its entirety, the

Code of Student Behaviour

Failure to know the code is not an acceptable excuse for breaking the code.

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (on the University Governance website) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Engineering students studying in the province of Alberta should also follow the

Code of Ethics

by The Association of Professional Engineers and Geoscientists of Alberta (APEGA).

The Code of Student Behaviour should not be too hard to follow. Listen to your instructor, be a good person, and do your own work, as this will lead you toward a path to success. Failure to follow the code can result in a grade of ‘F’ for the course, a transcript remark, suspension, and even expulsion from the university.

"Integrity is doing the right thing, even when no one is watching"
C. S. Lewis

Engineering at Alberta

NEED HELP?

There are a lot of services available to students on campus and in Edmonton, and sometimes it's hard to know where to go. While this isn't a comprehensive list, the services shown here should at least give you some ideas about where to start. If you're still not sure, check out the services just beneath this box—they'll give you the guidance you're looking for.

DON'T KNOW WHERE TO GO?

Student Service Centre

The U of A's central hub to find the right help for your needs.
uab.ca/ask

24/7 HELP

Empower Me (international)

1-833-628-5589

Edmonton Distress Line

780-482-4357 (HELP)

WELLNESS

Counselling and Clinical Services

Free, short-term, appointment-based counselling and psychiatric services. Also offers drop-in workshops. Book an initial consultation.
P: 780-492-5205
M, R, F, 8:00am-4:00pm; T, W, 8:00am-7:00pm

Interfaith Chaplains' Association

Get guidance, care, and support, whether or not you identify with a particular faith. Make an appointment.
P: 780-492-0339 | E: interfaithchaplains@ualberta.ca

The Landing

Offers drop-in support on matters of gender and sexual diversity.
P: 780-492-4949 | E: thelanding@su.ualberta.ca
M-R, hours vary

Peer Support Centre

Anonymous, confidential help from trained students. By appointment only.
P:780-492-4268 | E: psc@su.ualberta.ca
M-F, 9:00am-8:00pm

Sexual Assault Centre

Free, anonymous, and confidential drop-in counselling.
P: 780-492-9771 | E: sexualassaultcentre@ualberta.ca
M-F, 9:00am-8:00pm

University Health Centre

An on-campus health clinic that provides medical services to staff, students, and their spouses and children.
P: 780-492-2612 | E: hws@ualberta.ca
M-F, 8:30am-4:00pm

ACADEMIC

Engineering Student Services
Drop-in, first-come, first-served advising.
E: enggadvising@ualberta.ca

Engineering Student Success Centre
Drop-in tutoring for first-year courses.
E: dessc@ualberta.ca

Academic Success Centre
Many services to maximize your academic success.
E: success@ualberta.ca
M-F, 8:30am-4:30pm

Academic Accommodations
Connects students with disabilities to accommodations.
E: arrec@ualberta.ca
M-F, 8:30am-4:30pm

Office of the Student Ombuds
Call for complex problems and conflict mediation.
P: 780-492-4689 | E: ombuds@ualberta.ca

FINANCIAL

Student Service Centre
For awards and other funding supports.
uab.ca/ask

Campus Food Bank
Many food support options available.
E: info@campusfoodbank.com

SOCIAL

Unitea
Arrange a time to socialize with a peer.
E: unitea@ualberta.ca

BearsDen
U of A webpage. Find student groups, local events, and volunteer opportunities.

WORRIED ABOUT SOMEONE?

Helping Individuals at Risk (HIAR)
If you're worried about someone because of the things they've been saying or doing, or there's a noticeable change in their behaviour (often in multiple ways), contact HIAR, who will protect your confidentiality and help decide how best to support the person.

780-492-4372
hiarua@ualberta.ca

CONFIDENTIAL SUPPORT

Office of Safe Disclosure and Human Rights

The OSDHR advises confidentially on sensitive issues you may not feel comfortable solving on your own. Contact the OSDHR if you want to get help or to make a report while keeping your privacy.

780-492-7357
osdhr@ualberta.ca