Course Syllabus
CMPT 270: Developing Object-Oriented Systems

Catalogue Description
Object-oriented programming. The use of modeling, abstractions, patterns, and GUIs to design and build a good OO system. Unit testing to ensure that it works. Applications of the techniques to interactive systems.

Prerequisite(s): CMPT 115 or 117; and 3 credit units of 100-level calculus or STAT 245 or equivalent.

Note: Students with credit for CMPT 250 may not take this course for credit.

Lectures: Tu/Th 2:30pm-3:50pm — Thorv 271

Tutorials:
- T01 (M 9:00-10:20am) — Spinks S320
- T03 (W 4:00-5:20pm) — Spinks S320
- T05 (Tu 4:00-5:20pm) — Spinks S320
- T07 (M 10:30-11:50am) — Spinks S320

Website: Moodle

Instructor Information

Instructor: Ian Stavness

Contact:
- Office: Thorv 377.4
- Phone: 306-966-7995

Help Desk Hours:
- During Tutorial sections

Tutorial Leader: Jordan Ubbens (cmpt270_2017@cs.usask.ca) — include CMPT270 in Subject line

Course Objectives
CMPT 270 exposes students to object-oriented programming concepts with the following objectives:

- Learn how to program in the object-oriented programming language Java.
- Learn the basics of GUIs, graphics, and concurrent programming in Java.
- Learn the techniques of unit testing.
- Learn the basic principles of designing and building a large software system.
Student Evaluation

Grading Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>55%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Assignments

The course assignments are structured around developing a large object-oriented software system in a sequence of stages. The tentative assignment schedule is as follows:

- **Assignment 1** 5% due Sept. 22 Finding object types and their features
- **Assignment 2A** 5% due Sept. 29 Getting Started With Java, Part A
- **Assignment 2B** 18% due Oct. 6 Getting Started With Java, Part B
- **Assignment 3** 18% due Oct. 20 Inheritance and Data Structures
- **Assignment 4** 18% due Nov. 3 Three-Layer Architecture
- **Assignment 5** 18% due Nov. 20 Graphic User Interfaces
- **Assignment 6** 18% due Dec. 4 Model-View-Controller Architecture

Midterm

The midterm is scheduled for in-class on Thursday Oct. 26.

Criteria That Must Be Met To Pass

Students must achieve an total mark of 50% or greater to pass the course.

Attendance Expectation

Regular attendance is expected.

Final Exam Scheduling

The Registrar schedules all final examinations, including deferred and supplemental exams. Students are advised not to make travel arrangements for the exam period until the official exam schedule has been posted.

Note: All students must be properly registered in order to attend lectures and receive credit for this course.
Textbook Information

Required Text


Recommended Texts

“Data Structures and Software Development in an Object-Oriented Domain” Java Edition by Jean-Paul Tremblay and Grant A. Cheston (Prentice Hall, 2002).  *** Required excerpts will be posted to Moodle ***


## Lecture Schedule

<table>
<thead>
<tr>
<th>Topic</th>
<th>Subtopics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>overview of course objectives and evaluation</td>
</tr>
<tr>
<td>Java Basics</td>
<td>syntax, types, arrays, compiling, using Eclipse, style</td>
</tr>
<tr>
<td>Objects and Classes</td>
<td>classes, interfaces, constructors, members, methods</td>
</tr>
<tr>
<td>Inheritance and Interfaces</td>
<td>subclasses, this, super, Object, polymorphism</td>
</tr>
<tr>
<td>Testing basics</td>
<td>notation, black-box testing, special case testing, boundary value testing, regression testing, bottom-up vs. top-down testing</td>
</tr>
<tr>
<td>Exception handling</td>
<td>exceptions, throw, try/catch</td>
</tr>
<tr>
<td>Review Linear Data Structures</td>
<td>Java Collections, Set, Map, ArrayList, Iterators, Stack, Queue</td>
</tr>
<tr>
<td>More Java</td>
<td>typing, Java Generics, static variables and methods</td>
</tr>
<tr>
<td>Object-Oriented Design</td>
<td>decomposition, abstraction, locality, cohesion, coupling, information hiding, classification of classes, two-layer architecture, command pattern, data model, design manual, design reviews</td>
</tr>
<tr>
<td>Graphical User Interfaces</td>
<td>frames, events and listeners, components, layouts, AWT, Swing</td>
</tr>
<tr>
<td>Graphics</td>
<td>JPanel, paintComponent, Graphics2D, shapes, text, images</td>
</tr>
<tr>
<td>Multi-threading</td>
<td>basic parallel execution, threads, race conditions, deadlocks, thread safety, synchronization</td>
</tr>
<tr>
<td>Animation</td>
<td>animation via Timer class and events, animation via threads</td>
</tr>
<tr>
<td>Model-view-controller</td>
<td>ball-and-socket UML, observer pattern, model-view-controller architecture, game example</td>
</tr>
<tr>
<td>More Testing</td>
<td>equivalence-class testing, white box testing, testing loops and recursion, gray-box and Object-oriented testing</td>
</tr>
<tr>
<td>Files and Streams</td>
<td>text input (Scanner / Reader), binary input (DataInputStream, ObjectInputStream, serialization), output: PrintStream, DataOutputStream, ObjectOutputStream, PrintWriter</td>
</tr>
<tr>
<td>Java Generics</td>
<td>generic types, usage, best practices</td>
</tr>
</tbody>
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Policies

Late Assignments

Assignments 1-4 are due Fridays at 11:55pm. Late assignments may be submitted by the following Monday before 11:55pm, but will be deducted 50%. Assignments submitted later than this will receive a mark of zero.

Assignments 5-6 are due Mondays at 11:55pm. Late assignments may be submitted by the following Thursday before 11:55pm, but will be deducted 50%. Assignments submitted later than this will receive a mark of zero.

Missed Assignments

Missed assignments (submitted later than Monday at 11:55pm following the assignment deadline) will be given a grade of zero.

Missed Examinations

1. "Students who have missed an exam or assignment must contact their instructor as soon as possible. A doctor’s note is required for misses due to illness. Arrangements to make up the exam may be arranged with the instructor. Missed exams throughout the year are left up to the discretion of the instructor if a student may make up the exam or write at a different time. If a student knows prior to the exam that she/he will not be able to attend, they should let the instructor know before the exam."

2. "Final exams - a student who is absent from a final examination through no fault of his or her own, for medical or other valid reasons, may apply to the College of Arts and Science Dean’s office. The application must be made within three days of the missed examination along with supporting documentary evidence. Deferred exams are written during the February mid-term break for Term 1 courses and in early June for Term 2 and full year courses."

Incomplete Course Work and Final Grades

When a student has not completed the required course work, which includes any assignment or examination including the final examination, by the time of submission of the final grades, they may be granted an extension to permit completion of an assignment, or granted a deferred examination in the case of absence from a final examination. Extensions for the completion of assignments must be approved by the Department Head, or Dean in non-departmentalized Colleges, and may exceed thirty days only in unusual circumstances. The student must apply to the instructor for such an extension and furnish satisfactory reasons for the deficiency. Deferred final examinations are granted as per College policy.

In the interim, the instructor will submit a computed percentile grade for the course which factors in the incomplete course work as a zero, along with a grade comment of INF (Incomplete Failure) if a failing grade. In the case where the instructor has indicated in the course outline that failure to complete the required course work will result in failure in the course, and the student has a computed passing percentile grade, a final grade of 49% will be submitted along with a grade comment of INF (Incomplete Failure).

If an extension is granted and the required assignment is submitted within the allotted time, or if a deferred examination is granted and written in the case of absence from the final examination, the instructor will submit a revised computed final percentage grade. The grade change will replace the previous grade and any grade comment of INF (Incomplete Failure) will be removed. For provisions governing examinations and grading, students are referred to the University Council Regulations on Examinations subsection of the Calendar.

(2011 University of Saskatchewan Calendar/Academic Courses Policy)

Academic Honesty

The University of Saskatchewan 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 Student Conduct & Appeals subsection of the University Secretary Website and avoid any behaviour that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offense. Academic dishonesty is a serious offense and can result in suspension or expulsion from the University.


Academic honesty is also defined and described in the Department of Computer Science Statement on Academic Honesty:

For more information on what academic integrity means for students see the Student Conduct & Appeals subsection of the University Secretary Website at:

Examinations with Disability Services for Students (DSS)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Disability Services for Students (DSS) if they have not already done so. Students who suspect they may have disabilities should contact DSS for advice and referrals. In order to access DSS programs and supports, students must follow DSS policy and procedures. For more information, check http://www.students.usask.ca/disability/, or contact DSS at 966-7273 or dss@usask.ca.

Students registered with DSS may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through DSS by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by DSS.