

The Pennsylvania State University - College of Information Sciences and Technology

IST 311 – Object-Oriented Design and Software Applications - Fall, 2016

Section 1: 1:35-2:50pm, Section 2: 4:35-5:50 in 110 IST Bldg.

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Course Web Site: We will be using the Canvas learning management system: <https://psu.instructure.com>

Course Overview

This course will provide students with a background in object-oriented design and software development. Using modern design and programming languages (UML and Java) and with the support of CASE tools (such as Microsoft Visio), students will gain an appreciation for the nature of object-oriented software design and for some of the issues that arise in the space between requirements analysis and design, and between design and implementation. The course will interleave design and programming activities and will incorporate active, collaborative and problem-based learning experiences to the greatest possible extent.

Course Objectives: At the conclusion of this course, students will be able to:

- Understand and explain the foundations of the object-oriented software paradigm.
- Understand and explain the central issues in software design and development.
- Use the Java programming language and some of its core class libraries.
- Use the Unified Modeling Language (UML) to represent different system design elements.
- Design and implement a user-interactive, graphically-windowed, event-driven application of medium complexity using the Java language.

Course Texts and Required Readings: Most books needed are available from the Safari repository:

<http://proquest.safaribooksonline.com.ezaccess.libraries.psu.edu/>

UML References:

1. *UML Distilled: A Brief Guide to the Standard Object Modeling Language, Second Edition*, 1999, Fowler, M. Addison Wesley Professional.

This second edition covers topics in the same order in which we will study them. But you may instead use the third edition, which is freely available on the Safari website:

<http://proquest.safaribooksonline.com.ezaccess.libraries.psu.edu/0321193687>

2. *Learning UML 2.0*, 2006, Miles R. and Hamilton, K, O'Reilly Media, Inc., ISBN 0-596-00982-8
<http://proquestcombo.safaribooksonline.com.ezaccess.libraries.psu.edu/0596009828>

3. *The Elements of UML 2.0 Style*, 2002, Ambler, S.W., Cambridge University Press

Object-Oriented Design:

Object-Oriented Analysis and Design with Applications, Third Edition 2007, Booch, G. et al., Addison-Wesley Professional, ISBN 0-201-89551-X.

<http://proquestcombo.safaribooksonline.com.ezaccess.libraries.psu.edu/9780201895513>

Java References: Intermediate Object-Oriented Java Programming skill is a prerequisite for IST 311. For Java reference, you can use any book you like with sufficient coverage of course topics. Some examples from the Safari library include

1. *Sams Teach Yourself Java in 21 Days*, 2012, Cadenhead, R., Sams.
<http://proquest.safaribooksonline.com.ezaccess.libraries.psu.edu/9780672329432>
2. *Big Java Late Objects*, 2012, Horstmann, C.S., John Wiley & Sons
<http://proquestcombo.safaribooksonline.com/book/programming/java/9781118087886>

There are many other good Java reference books, and other open source books will be made available. An especially good Java reference book for someone with intermediate Java programming skill, but **not** in the Safari library is: *Core Java for the Impatient*, 2015, Horstmann, C.S., Addison Wesley.

You are responsible for all assigned readings, even if the material is not covered explicitly in class. Please read over the assigned material prior to class and be prepared to discuss and ask questions about the covered topics. You should also review the material after class as not every topic will be covered during class time. Many passages in the text may need to be read several times to gain clarity. Taking notes on the material you are reading and reflecting on both the reading and these notes will help you to understand better the issues, concepts and techniques that are being presented.

Outline the Readings. I strongly suggest that you outline the material you are reading - reflecting on both the reading and these notes will help you to understand better the issues, concepts and techniques that are being presented.

Course Tools

The course will make use of several different technologies including an Integrated Development Environment (IDE), software modeling and design applications, and demonstration and walkthrough recording software. Specific instructions for specific tools will be posted to the Canvas Unit where related activities and deliverables appear.

Java Development

- You will be using the Netbeans Integrated Development Environment for all project development work. Netbeans is free and is available for the Windows, Mac, and Linux operating systems.
- The Netbeans web site is at: <https://netbeans.org/features/index.html>
- Download the Netbeans IDE and Java SE from: <http://www.oracle.com/technetwork/java/javase/downloads/jdk-7-netbeans-download-432126.html>

Conceptual Design

- You will be using the Unified Modeling Language (UML) for part of your conceptual design. There are several software tools available for constructing UML models.
- You may choose to use the MS Visio application, which is available through vLabs. The course lessons generally use MS Visio for UML demonstrations. Instructions for using vLabs can be found here: https://online.ist.psu.edu/sites/ist110/files/vlabs_Classroom_Overview.pdf
- You can also install MS Visio on your own computer through the Penn State Dreamspark program: <https://www.up.ist.psu.edu/dreamspark/access.php>
- An open source and free tool you can use to create your UML diagrams is ArgoUML. See: <http://argouml.tigris.org/>
- Finally, you may also choose to use an online tool for creating your UML models. One that has been tested and is recommended for the course is draw.io. See: <https://www.draw.io/>
- You can use any UML modeling tool you like as long as it will produce a figure or file that can be inserted into an MS Word document.

Assessment and Grading

The following weights are assigned to the different assessed components of the course:

Quizzes: 25%; In- and out-of-class activities: 35%; Project: 40%

Grading Scale: Assessment is based on 100 possible points with letter grades being assigned as follows:

A: 93-100	A-: 89-92.9	B+: 86-88.9	B: 83-85.9	B-: 79-82.9	C+: 76-78.9	C: 70-75.9	D: 60-69.9	F: 0-59.9
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Assignment Grading Criteria:

- Correctness (e.g. diagrams use correct syntax; programs compile & run appropriate test cases correctly)
- Completeness (e.g. models reflect the domain problem; programs implement requirements)
- Clarity (e.g. diagrams and programs are formatted professionally; both are annotated)

Course Style

The course will follow an active, problem-based approach to learning. There are no exams. Quizzes, homework assignments and longer-term group projects will provide the opportunity to gain practice with new concepts and skills, and develop and demonstrate a solid understanding of the course material.

Quizzes:

About five (5) quizzes will be given over the course of the semester to encourage your ongoing attention to course material. Covered topics will be drawn largely from assigned readings, but all other lecture content and supplementary readings are also fair game.

Activities

Homework activities are assigned and reviewed regularly. The purpose of many homework assignments is to encourage you to explore material *before* it is discussed in class. Homework assignments are marked with an emphasis on effort and completeness. Many homework assignments are for paired work but note that this will be specified for each assignment, assume that you are to complete assignments on your own, individually, unless explicit in the assignment.

Course Project

The main course project will consist of design and development of a substantial object-oriented software application. You will work on the project exercises in groups of three or less. The instructor will assign group membership during the first few weeks of class. The purpose of this project is to give you hands-on, in-depth experience with a wide range of object-oriented design and development activities.

Group Project Performance & Grading

The mid-term and final group project deliverables as well as any deliverables collected and marked between these major project milestones will be assigned a single grade. However, your individual grade for the group project components will reflect the results of group peer evaluations that will be performed over the course of the semester. In extreme cases, students that do not contribute to the group project will be asked to do the work on their own or with other non-contributors.

Course Policies and Expectations

- **Attendance:** Class attendance, excused absences, and makeup policy are governed by Penn State Faculty Senate Rule 42-47: <http://senate.psu.edu/policies/42-00.html#42-27>.

Daily attendance will be taken. The following table defines the attendance policy for the course:

Up to 4 missed classes	No grade deduction
5-6 missed classes	Minus one grade fraction (e.g., A- becomes a B+)
7-8 missed classes	Minus one full grade (e.g., A- becomes a B-)
9-10 missed classes	Minus two full grades (e.g., A- becomes a C-)
More than 10 missed classes	Fail the course (i.e., you receive an F)

- **Deliverable Late Policy:**

- Each deliverable has an “official” due date on Canvas. You must make a submission by that posted “official” due date unless a valid excuse is requested and accepted by the instructor, as outlined below in the Excused Absences sections.
- However, except for the last project sprint and the final project deliverable, a “final due date” beyond this will be posted. You may, optionally, turn in an updated version of your deliverable by this “final” deadline. Unless you have requested and been granted a valid excuse for the initial deliverable, this is the absolute deadline. For this reason, it is essential that you make a submission by the official deadline.

- **Logging into Canvas:**

Students are expected to login regularly to check for course updates, announcements, emails, discussions, etc.

- Updates will occur regularly so please make sure to keep up with announcements and updates to the course site.
- You should definitely check your Canvas notification settings to make absolutely sure you are being notified on all Canvas course announcements. Make sure these notifications are being sent to an email you monitor regularly – there may be occasional late-breaking announcements about things like updates/hints to an assignment, class cancellation due to emergency/illness, or other things you need to know about right away.

- **Discussion Forum:** I encourage you to use the Canvas discussion forum facility to ask questions. The instructor and assistants will monitor these regularly and get answers to you quickly.

- **Emailing Instructor or Assistants:** For any personal issues (e.g., illness, personal issues or emergency), email the instructor or the assistants directly using the email addresses given in the syllabus. You are always welcome to email us, but it is better to post technical or administrative questions on the discussion forum.

- **Academic Integrity:** You will be held responsible to conduct yourself according to Penn State's Academic Integrity policy. The policy, as well, is detailed here - <https://handbook.psu.edu/content/academic-integrity>. By taking this course, you are agreeing to read and follow this policy, as well as IST-specific policies given here - https://ist.psu.edu/students/academic_integrity

- **Excused Absences:** Excused absences are governed by Faculty Senate Policy E-11 - <http://undergrad.psu.edu/aappm/E-11-class-attendance.html> – you must follow the procedure outlined there to be eligible to make up work missed during and excused absence. In particular, you must make a formal request for an extension for every excused absence, and the instructor will make a formal determination on every case.

- **Extended Excused Absences:** Policy E-11 above provides that verification of minor illnesses is not necessary. However, for extended absences due to things like illness or other personal emergency, instructors may require documentation which may be obtained using this procedure, which may be viewed here - <http://studentaffairs.psu.edu/health/welcome/illnessVerification/>

Technical Requirements

All course work can be completed on IST classroom computers. If you want to use your personal/home computers, they must be adequate to use Canvas and support the needed software described above in the Course Tools section of this syllabus. This isn't a World Campus course, but Standard World Campus computer technical specifications should give you a good idea if your system will work. You can test your computer [here](#) – this links to an external site - for requirements. In addition, you may also find a webcam and a headset with a microphone useful for virtual meetings or presentations with group members and other classmates.

Penn State and IST Resources

Find extensive information and links to many resources, including the Penn State library, web conferencing, course tools, writing help, and much more on the [IST Resources Page](#) .

Overview of University Policies

Review current information regarding Penn State policies, including Academic Integrity, Disability Accommodations, Military Accommodations, and many others on the [University Policies Page](#).