CSCI 2600 section 01 Syllabus

PRINCIPLES OF SOFTWARE

Course Information

CSCI 2600 01 : PRINCIPLES OF SOFTWARE

(4 Credits)

2023_Spring Term Computer Science School of Science

2023_Spring Term [202301]
Term Start Date: Monday, 9-Jan-2023 **Term End Date:** Wednesday, 21-Jun-2023

ADD TO CALENDAR

Location and Schedule:
CRN: 78505

https://lms.rpi.edu/

Other LMS Information:

https://submitty.cs.rpi.edu/courses/s23/csci2600
https://www.cs.rpi.edu/academics/courses/spring23/csci2600/

Prerequisites or Other Requirements:

CSCI 1200 Data Structures and CSCI 2200 Foundations of Computer Science

Additional Information for Course Information Section:

Meeting Place: Darrin 308
Meeting Hours: Mondays and Thursdays 4:00-5:50pm

Test Time: Thursdays 6:00-7:50pm

Course Themes

Software Development Tools. Reasoning about Code. Inheritance and Polymorphism. Design Patterns. GUI and Event-Driven Programming.

Instructor Information

Instructor

Konstantin Kuzmin
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Additional Instructor Details:

Instructor
Konstantin Kuzmin
Lecturer
Department of Computer Science
Office: Amos Eaton 112
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Office Hours: TBA or by appointment

Additional Information for the Instructor Section:

Instructional Support Coordinator: Shianne Hulbert

Teaching Assistant(s)

Teaching Assistant Information:

TAs: Vasundhara Acharya, Kushal Bhandari, Aashi Gupta, Seth Laurenceau, and Matthew Pisano.
TAs' Office: TBA
TAs' Office Hours: Vasundhara Acharya: TBA Kushal Bhandari: TBA Aashi Gupta: TBA Seth Laurenceau: TBA Matthew Pisano: TBA
TAs' Email: psoftstaff@cs.lists.rpi.edu
Mentors: Yuetian Chen, Daxin Huang, Gabriel Jacoby-Cooper, Hanson Ma, Stoll Shane, Andrew Walek, Allan Wang, Luke Williams, Zhengwen Xu.

Course Description

Additional Course Description :

A study of important concepts in software design, implementation, and testing. Topics include specification, abstraction with classes, design principles and patterns, testing, refactoring, the software development process, and GUI and event-driven programming. The course also introduces implementation and testing tools, including IDEs, revision control systems, and other frameworks. The overarching goal of the course is for students to learn how to write correct and maintainable software.

Course Text(s)

Text Details:

Reading Material

- Effective Java, Third Edition, by Joshua Bloch, Addison-Wesley, 2019.
- Design Patterns: Elements of Reusable Object-Oriented Software by Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, Addison-Wesley, 1995
- Refactoring: Improving the Design of Existing Code by Martin Fowler, Addison-Wesley, 2019
- A Philosophy of Software Design by John Ousterhout, Yaknyam Press, 2018
- Program Development in Java: Abstraction, Specification, and Object-Oriented Design by John Guttag, Barbara Liskov, Addison-Wesley, 2000

While none of the books is required, these are all highly recommended books worth having on your bookshelf.

Course Goals

Goals:

Course Contents

1. Introduction
   - Java, Eclipse, Git
2. Reasoning about Code
   - Hoare logic
   - Loop invariants
   - Dafny
   - Specifications
   - Abstract Data Types
   - Testing
   - Exceptions
   - Identity, Equality
3. Inheritance and Polymorphism
   - Subtype Polymorphism
   - Liskov Substitution Principle
   - Inheritance
   - Parametric Polymorphism
4. Design Patterns
   - Patterns
   - Antipatterns, Refactoring
   - Event-Driven, GUI Programming

- Software Process
- Usability

Course Content

Content Details:

Schedule is tentative and subject to change.

Date	Topic
01/09	Introduction to Principles of Software: syllabus, schedule, tools, Java
01/12	Eclipse, Git, Submitty
01/19	C++ vs. Java
01/23	Reasoning about code
01/26	Hoare logic, comparing condition strength
01/30	Loops and loop invariants
02/02	Dafny
02/06	Specifications
02/09	Specification strength
02/13	Abstract Data Types (ADT)
02/16	Representation invariants, abstraction functions
02/20	Reasoning about ADTs
02/21	No class. Classes follow Monday schedule.
02/23	Testing, black box testing, white box testing
02/27	Exceptions
03/02	Identity, equality
03/06-03/10	Spring break, no classes.
03/13	Identity, equality
03/16	Subclassing in Java, Liskov Substitution Principle (LSP)
03/20	Subtype polymorphism
03/23	Parametric polymorphism
03/27	Design patterns, dependencies
03/30	Design patterns
04/03	Design patterns
04/06	Design patterns
04/10	Design patterns
04/13	Refactoring
04/17	Refactoring, debugging
04/20	Software process, usability
04/24	Review
TBA	Final Exam

Learning Outcomes

Course (Student) Learning Outcomes (CLOs):

Apply fundamental principles such as reasoning about code, specification, abstraction, design patterns, testing, refactoring and software process, towards building software systems.

Demonstrate competence with modern software engineering tools such as the Eclipse IDE, the JUnit Framework, revision control, test coverage tools and others.

Demonstrate competence with the Java programming language and the Java libraries.

Course (Student) Learning Outcomes Assessment Measures:

Quizzes
Homework assignments
Tests
Final exam

Program Learning Outcomes:

No student outcomes were defined and mapped to this course by any published programs.

Grading Criteria

Criteria Details:

There are eight homework assignments to be completed individually. Do not show your code to any other student and do not look at any other student's code. Do not put your code in a public directory or otherwise make it public. You are encouraged to use the Submitty Discussion Forum to post questions so that other students can also answer/see the answers. Assignments are due at 11:59pm EST/EDT on the due date. You have seven late days for the entire semester without penalty with a maximum of two late days per assignment.

Some problems may be assigned in class, though not collected for credit. Doing all such assignments will greatly improve your understanding of the course material and therefore your grades on homework projects.

Homework requirements and instructions for submitting assignments will be made available for each assignment. Homework requiring programming must include the submission of well-commented source code. All programming assignments must execute successfully on the Linux operating system installed on the Submitty system. Documented source code and separate files containing answers to questions will be required for each assignment.

There are two tests and one final exam, to be completed individually. All answers must be your own.

There are eight in-class quizzes, which are to be completed individually after a brief group discussion.

Quizzes	12%
Homework Assignments	50%
Tests	18%
Final Exam	20%

Final letter grades will be assigned as follows:

Letter	Grade Range
A	[93-100]
A-	[90-93)
B+	[87-90)
B	[83-87)
B-	[80-83)
C+	[77-80)
C	[73-77)
C-	[70-73)
D+	[67-70)
D	[60-67)
F	[0-60)

All grades are rounded only before applying the cutoffs. Rounding is performed to the nearest 0.01 using the bankers' rounding method. Cutoffs may end up lower than this but will not be raised from here. Thus, for example, if you earn 92.9950 it is rounded to 93.00. After applying the cutoff of 93, you are assured of earning an A, regardless of what other students earn. If your average grade is 92.9949, it is rounded to 92.99. If the cutoff for an A is 93, you will get an A-.

Policies

Attendance Policy:

Please attend class and be prepared to participate in class discussions and activities. Further, team-based work requires full cooperation and coordination from each team member. Lack of participation is detrimental to team-based work and grades suffer accordingly. Note that students are not required to work in teams. All lecture notes and examples will be available on the Class Web site.

Other Course Policies:

Grading Policies

- Grades for tests, quizzes, and individual and team-based assignments are determined by the instructor and/or the TAs.
- Students may appeal a grade by issuing a Grade Inquiry on Submitty. No appeals will be accepted by email.
- Appeals must be presented **within one week** of the assignment's grade being returned to the student.
- Requests for makeup tests or quizzes must be accompanied by an excuse from the Student Success office. **Quizzes may be only made up before the class following the missed quiz.**
- Grades will be provided to students throughout the semester to provide an ongoing assessment of their progress.

Academic Integrity

Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities and The Graduate Student Supplement define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration.

Violations of academic integrity may also be reported to the appropriate Dean (Dean of Students for undergraduate students or the Dean of Graduate Education for graduate students, respectively).

If you have any question concerning this policy before submitting an assignment, please ask for clarification. In addition, you can visit the following site for more information on our Academic Integrity Policy: Students Rights, Responsibilities, and Judicial Affairs.

Disability Services

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on a disability, please let me know immediately so that we can discuss your options. To establish reasonable accommodations, please register with The Office of Disability Services for Students. After registration, make arrangements with the Director of Disability Services as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. DSS contact information: dss@rpi.edu; +1-518-276-8197; 4226 Academy Hall.

Disability Services for Students

Support Services

RPInfo - contains various resource links for students, academic resources, support services, and safety & emergency preparedness.

Rensselaer IT Services and Support Center

Additional Academic Integrity Course Policy and Penalty Information:

Individual programming assignments in this course must be the sole work of the individual student, though your instructor, TAs, and undergraduate mentors may help in figuring out how to solve the given problems. For team-based work (though working in a team is optional), work must be the sole work of the individual team members, though your professor, TAs, and fellow classmates may help in figuring out how to solve the given problems.

Sharing of code or submitting code which is not yours, even partially, is strictly forbidden and will not be tolerated.

If found in violation of academic dishonesty policy, students will be subject to two types of penalties: (1) the instructor administers an academic (grade) penalty; and/or (2) the student may be subject to the procedures and penalties of the student judicial system outlined in the Rensselaer Handbook of Student Rights and Responsibilities.

Students found in violation of the Academic Integrity Policy will receive a grade of zero for the quiz, assignment, test, or exam in question in addition to receiving a five percentage points deduction from their final grade. A second violation will lead to an automatic "F" grade and referral to the Academic Dean's office for disciplinary action.

Other Course-Specific Information

Additional Course Information:

Java Resources

- Main Java website by Oracle: http://java.com
- Java documentation: http://docs.oracle.com/javase/
- Java API: https://docs.oracle.com/en/java/javase/8/docs/api/index.html
- Java tutorial: http://docs.oracle.com/javase/tutorial/
- Java language specification: http://docs.oracle.com/javase/specs/
- Java News, and Resources: https://go.java/index.html