CSCI 2600 section 01 Syllabus
PRINCIPLES OF SOFTWARE

Course Information

CSCI 2600 01 : PRINCIPLES OF SOFTWARE ( 4 Credits )

2021_Spring Term  Computer Science  School of Science

2021_Spring Term [202101]
Term Start Date: Wednesday, 13-Jan-2021  Term End Date: Friday, 18-Jun-2021

Location and Schedule:
CRN:  CSCI2600

RPI Institute LMS Link
https://lms.rpi.edu/

Other LMS Information
https://submitly.cs.rpi.edu/courses/s21/csci2600
https://www.cs.rpi.edu/academics/courses/spring21/csci2600/

Prerequisites or Other Requirements
CSCI 1200 Data Structures and CSCI 2200 Foundations of Computer Science

Additional Information for Course Information Section
Meeting Place:  WebEx Meetings
Meeting Hours: Mondays and Thursdays 2:30-4:20pm
Test Time:  Thursday 6:55-8:45pm

Course Themes

Instructor Information

Instructors
Konstantin Kuzmin  kuzmik2@rpi.edu
Carlos Varela  varelc@rpi.edu

Teaching Assistants
Ankita Bhaumik  bhaumik@rpi.edu
Lilian Ngweta  ngwelt@rpi.edu
Additional Instructor Details

Instructor
Carlos Varela
Professor
Department of Computer Science
Office: Lally 308 (x 6912)
WebEx Personal Room: https://rensselaer.webex.com/meet/varelc
Office Hours: Mondays and Thursdays, 1:15-2:15pm; or by appointment

Co-Instructor
Konstantin Kuzmin
Lecturer
Department of Computer Science
Office: Amos Eaton 112
Telephone: +1(518)276-2609
WebEx Personal Room: By appointment

Additional Information for the Instructor Section

Instructional Support Coordinator: Shianne Hulbert

Teaching Assistant(s)

Teaching Assistant Information
TAs’ Office: WebEx Teams
TAs’ Office Hours: Ankita Bhaumik: Wednesday 12:00-2:00pm, Tuesday 6:30-8:30 pm  Lilian Ngweta: Friday 12:00-4:00pm  Vipula Rawte: Wednesday 2:30-6:30pm  Jiawen Zhang: Tuesday 10:00-12:00pm, Wednesday 10:00-12:00pm
TAs’ Email: psoftstaff@cs.lists.rpi.edu
Mentors: Kongmin Cao, Dennis Chau, Rory Eiffe, Robin Hong, Richard Le, Zangcheng Li, Zachary McDaniel, Ruben McWilliams, Joseph Napolitano, Emma Skantze.

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

- 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 in 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

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Grade</th>
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<tr>
<td>01/25</td>
<td>Introduction to Principles of Software: syllabus, schedule, tools, Java.</td>
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<td>01/28</td>
<td>C++ vs Java, Eclipse, Git, Submitty--Homework 0 Due 02/05</td>
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<tr>
<td>02/01</td>
<td>Reasoning about Code</td>
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<td>Hoare Logic, Loops--Quiz 1</td>
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<td>Testing, Black Box Testing, White Box Testing--Exam 1</td>
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<td>Exceptions--Quiz 4</td>
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<td>Subtype Polymorphism, Liskov Substitution Principle (LSP)</td>
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<td>03/25</td>
<td>Subclassing in Java, Subtype Polymorphism</td>
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<td>Subclassing in Java, Subtype Polymorphism--Homework 5 Due 04/09--Quiz 5</td>
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<td>04/15</td>
<td>Antipatterns, Refactoring</td>
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<td>04/19</td>
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<td>Event-Driven, GUI Programming--Homework 7 Due 04/30</td>
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<td>04/26</td>
<td>Software Process</td>
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<td>05/03</td>
<td>Review</td>
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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

- Homework assignments
- Partial exams
- 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 8 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 on the due date. You have 7 late days for the entire semester without penalty with a maximum of 2 late days per assignment.

Project requirements and instructions for submitting assignments will be made available for each assignment. Projects 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 partial exams and one final exam, to be completed individually. All answers must be your own.

There are 8 in-class quizzes, which are to be completed individually after a brief group discussion.

- Homework Assignments 50%
- Partial Exams 25%
- Final Exam 25%

Final letter grades will be assigned as follows:

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<th>Letter</th>
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<td>A-</td>
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Policies

### 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

Students found in violation of academic dishonesty policies will receive a failing grade for this course.

### Other Course-Specific Information

### Additional Course Information

#### Java Resources

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