

# 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://submitty.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

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

## Instructor Information

#### Instructors

Konstantin Kuzmin  
[✉ kuzmik2@rpi.edu](mailto:kuzmik2@rpi.edu)


Carlos Varela  
[✉ varelc@rpi.edu](mailto:varelc@rpi.edu)

#### Teaching Assistants

Ankita Bhaumik  
[✉ bhauma@rpi.edu](mailto:bhauma@rpi.edu)

Lilian Ngweta  
[✉ ngwetl@rpi.edu](mailto:ngwetl@rpi.edu)

 Vipula Dattatrey Rawte  
✉ [rawtev@rpi.edu](mailto:rawtev@rpi.edu)

 Jiawen Zhang  
✉ [zhangj42@rpi.edu](mailto:zhangj42@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:**

**Office Hours:** By appointment

## Additional Information for the Instructor Section

**Instructional Support Coordinator:** Shianne Hulbert

## Teaching Assistant(s)

### Teaching Assistant Information

**TAs:** Ankita Bhaumik, Lilian Ngweta, Vipula Rawte, Jiawen Zhang.

**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](mailto:psoftstaff@cs.lists.rpi.edu)

**Mentors:** Kongmin Cao, Dennis Chau, Rory Eiffe, Robin Hong, Richard Le, Zhangcheng 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

- 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 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

Date	Topic	Grade
01/25	Introduction to Principles of Software: syllabus, schedule, tools, Java.	
01/28	C++ vs Java, Eclipse, Git, Submittity--Homework 0 Due 02/05	6.25%
02/01	Reasoning about Code	
02/04	Hoare Logic, Loops--Quiz 1	
02/08	Loops and Loop Invariants--Homework 1 Due 02/19	6.25%
02/11	Loops and Loop Invariants	
02/18	Dafny--Quiz 2	
02/22	Specifications--Homework 2 Due 03/02	6.25%
02/25	Specification Strength	
03/01	Abstract Data Types (ADT).	
03/04	Representation Invariants, Abstraction Functions--Homework 3 Due 03/16--Quiz 3	6.25%
03/08	Reasoning about ADTs.	
03/11	Testing, Black Box Testing, White Box Testing--Exam 1	12.5%
03/15	Exceptions--Quiz 4	
03/18	Identity, Equality--Homework 4 Due 03/26	6.25%
03/22	Subtype Polymorphism, Liskov Substitution Principle (LSP)	
03/25	Subclassing in Java, Subtype Polymorphism	
03/29	Subclassing in Java, Subtype Polymorphism--Homework 5 Due 04/09--Quiz 5	6.25%
04/01	Parametric Polymorphism--Exam 2.	12.5%
04/05	Design Patterns, Dependencies.	
04/08	Design Patterns--Quiz 6	
04/12	Design Patterns--Homework 6 Due 04/20	6.25%
04/15	Antipatterns, Refactoring	
04/19	Refactoring--Quiz 7	
04/22	Event-Driven, GUI Programming--Homework 7 Due 04/30	6.25%
04/26	Software Process	
04/29	Usability--Quiz 8	
05/03	Review	




## 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.

S3345

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

S3346

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

S3347


### 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 Submittly 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 Submittly 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:

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)



### 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](mailto: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>
- 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>

