

## CS112 - INTRODUCTION TO PROGRAMMING

Professor: Russell C. Bjork  
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Office: MacDonald 217 x4377  
Hours: MWF 2:10-3:10 pm; R 1:30-4:30 pm  
and by appointment  
Course Site: <http://www.cs.gordon.edu/courses/cs112>

Spring Semester, 2009  
MWF 1-2 pm  
Lab: Th. 9:45-12:45 pm  
(beginning 1/15 )

**PREREQUISITE:** Computer Science 111

### CATALOG DESCRIPTION:

Introduction to the object-oriented paradigm and programming using Java. Use, extension, and implementation of classes. Fundamental control structures. Encapsulation, basic data structures, and utility classes. Weekly programming laboratories. Prerequisite: CS111.

### COURSE OBJECTIVES:

In the broadest sense, computer programming is the entire process of creating a computerized solution to a problem, including analysis of the task, design of a solution strategy, and implementation and testing of the solution. This course is intended to introduce you to this process, using an object-oriented approach to analysis and design, and using the Java programming language for implementation. In particular, upon completion of this course, you should be able to:

1. Apply sound design and documentation principles to the development of programs.
2. Explain fundamental object-oriented concepts, such as “object”, “class”, “method”, “encapsulation”, “inheritance”, “polymorphism”, and “event-driven”.
3. Write simple programs using most of the capabilities of the Java language.
4. Utilize a number of classes in the basic Java 5 library packages.

**TEXT:** Bruce, Kim; Andrea Danyluk and Thomas Murtaugh. *Java: An Eventful Approach*. (Upper Saddle River, NJ: Pearson/Prentice-Hall, 2006)

**ON RESERVE:** Bergin, Joseph, Mark Stahlik, Jim Roberts, Rich Pattis. *Karel J. Robot: A Gentle Introduction to the Art of Programming in Java*. (Dream Songs Press, 2005).

### COURSE TECHNIQUES AND PROCEDURES

Since this course is primarily concerned with the development of certain skills and habits, regular practice with evaluation will be the heart of the course. For each unit of material, you will be asked to read a portion of the text book and to do assigned homework problems.

Class sessions will include a discussion and amplification of the material in the text and the presentation of further examples and supplementary material. You should not expect to grasp everything presented in the text when you first read it; however, you should note areas that are unclear to you and be prepared to raise questions about them in class.

As is true with any skill, the only way you can really learn programming is by doing it. For this reason, you will have opportunities to practice what you are learning by doing textbook exercises and through weekly laboratories. Additional practice will come from a series of programming projects of increasing complexity assigned during the term. You should look on these as being your key learning experience in the course.

## COURSE REQUIREMENTS AND EVALUATION:

1. You will be expected to read material from the textbook, as assigned in the schedule below. Reading assignments should be completed BEFORE the class hour in which the topic is discussed. Lecture presentations will assume that you have read the text, and it is expected that your participation in the class will reflect that fact. However, our classroom discussion will not rigidly follow the order of material in the text, nor will it be confined to material covered there.

The Bruce book contain embedded exercises to help you check your understanding of the material. Read with a pencil and paper in hand, and do these short exercises as you read along. Solutions for these are posted on the [Blackboard](#) site for the course so that you can check yourself. (Of course, you should not look at these until you have attempted the exercise yourself!)

Some of the questions on the midterm and final exams will be similar to these exercises and/or to the exercises discussed under (3) below. It is much to your advantage to work through them during the semester, rather than to see questions like them for the first time on the exams!

2. For the reading in the Karel J. Robot book, occasional, unannounced quizzes will be given at the start of class, focusing on the reading due for that day. These reading quizzes, together, will account for 2% of the final course grade. (Note: if you come to class late on a quiz day, you will miss the quiz!)
3. Each chapter in the Bruce book contains a section of “Chapter Review Problems” at the end. For most chapters, you will be expected to do these problems (in writing). We will use a few minutes of class time on the due date to go over some or all of the exercises in the assigned chapter. (If an exercise calls for writing Java code, it is sufficient to write the code by hand - you are not expected to actually create a program and run it on a computer.)

Since I will call on students at random to read their answers to the exercises (or to put their answers on the board), it is important that you come to class prepared! If you have an answer to read for the problem(s) you are called on for that reflects a reasonable effort to solve the problem (even if it is not correct), I will award full credit for that exercise set. If you do not have an answer to read, you will not receive credit for that exercise set. If you are not called on for a particular set, I will collect your exercise set and award credit based on the percentage of problems for which a reasonable attempt at solution was made.

The exercise sets will account for 10% of the course grade.

4. Weekly laboratories will focus on gaining practical experience with the material covered in the book and/or in lecture. Lab assignments will be given out the day before lab, and **must** be read over carefully **before** coming to lab. Note that a quiz based on this reading may be given at the start of lab.

For each laboratory, there will be a writeup to turn in. There may also be a quiz given at the start of the lab hour (based on your reading of the lab assignment) and/or a quiz based on the work done in lab given at the start of class on the due date. Each laboratory writeup and quiz(zes) will be worth 2% of the final course grade (24% total for the 12 labs with writeups).

The following are the tentative emphases for the lab sessions (*subject to change*):

<b><u>Lab</u></b>	<b><u>Emphasis</u></b>
1	Introduction to Objects
2	Karel J. Robot - Simple Tasks
3	Karel J. Robot - Selection and Repetition
4	Working with Numbers
5	Making Choices
6	Defining Classes
7	(Lab time used to work on Project 2 - no writeup or quiz)
8	Active Objects
9	Graphical User Interfaces
10	Recursion
11	Arrays
12	Characters and Strings
13	Inheritance and Polymorphism
14	(Lab time used to work on Project 4 - no writeup or quiz)

5. Four programming projects will be assigned. These projects must be done in accordance with the handout "Guidelines for Computer Science Projects", which will be distributed with the first project. You are expected to read these carefully and comply with them exactly.

The first project will be worth 4% of the final course grade; the remainder will be worth 7% each. (25% total for the 4 projects).

6. A mid-term examination (worth 18% of the final course grade) and a final examination (worth 21% of the final course grade) will be given as shown in the course schedule. Each exam will assume familiarity with material in the text, covered in lecture, and/or used in homework problems or projects. In particular, some of the problems will be similar to exercises in the book - either those intended to be done while reading the book, or those that are gone over in class. Exams will be open book (course text only), open notes.
7. Your final grade will be computed on the basis of a weighted sum of the items listed above.

Summary:	Reading Quizzes	2%
	Textbook Exercises	10%
	Labs	24%
	Programming Projects	25%
	Exams	39%
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		100%

The following are minimum guaranteed grades for the percentages indicated:

	93% - 100%: A	90% - 92.9%: A-
87% - 89.9%: B+	83% - 86.9%: B	80% - 82.9%: B-
77% - 79.9%: C+	73% - 76.9%: C	70% - 72.9%: C-
67% - 69.9%: D+	63% - 66.9%: D	60% - 62.9%: D-

## **POLICY STATEMENT ON EXTENSIONS AND INCOMPLETES:**

1. Extensions of the due dates for homework or projects will be given in the event of extenuating circumstances (such as illness, personal emergency) IF you submit a brief written request to the professor as soon as possible after the circumstances arise. This request will be initialed (if approved) and will be returned to you. You must attach it to the piece of work for which the extension was granted.
2. A grade of Incomplete will be given without penalty IF you are unable to complete the course work by the last day of the term due to major illness or other similar emergency. Again, a written request should be submitted. Such a request will only be granted if you are substantially up-to-date with your course work and were making good progress in the course up to the time that the difficulty arose. Of course, you must complete all work for the course by the midpoint of the next semester in accordance with College policy.
3. A grade of Incomplete with a penalty of one letter grade to be applied in the final grade computation MAY be given if you are unable to complete all the course work for reasons other than those noted above. You must make a written request, and your progress in the course, class attendance etc. will be taken into consideration in determining whether to grant it. Again, you must complete all work for the course by the midpoint of the next semester.

## **ATTENDANCE POLICY:**

Regular class attendance is expected of all students, and class attendance will be recorded. Absences from class will be classified as “documented” or “undocumented”. A documented absence is one where written documentation is submitted supporting an absence from class due to circumstances beyond the student’s control. An undocumented absence is any other absence, including one which could qualify as documented if proper documentation were submitted.

Students who have more than three absences (of any kind) during the semester should expect to see their final grade reduced by 1% for the lesser of the number of undocumented absences and the total number of absences over 3, and students who have more than 12 undocumented absences will fail the course automatically. Note that it is not necessary to document absences unless there are more than three total absences; for most students, this will avoid the need to submit documentation. A student who anticipates the need to miss more than three classes due to athletic competitions or other student activities should review the college’s attendance policy on page 31 of the catalog, and should then discuss alternatives to class attendance with the professor at the start of the semester.

A student who is habitually late will have late arrival for class counted as a half absence for that class, and a student who sleeps through most or all of a given class session will be counted as absent for that class.

You may ask the professor to waive this policy for you if you earned an A in the prerequisite course, or if you have an A average in this course as of the mid-term exam. If you wish to take advantage of this exemption, you must so inform the professor. However, the attendance policy will be reimposed if your subsequent work deteriorates.

## **STUDENTS WITH DISABILITIES:**

Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412 X4746) to:
  - a. make sure documentation of your disability is on file in the ASC,
  - b. discuss the accommodations for which you are eligible,
  - c. discuss the procedures for obtaining the accommodations, and
  - d. obtain a **Faculty Notification Form**.

2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester*; at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. (See also Grievance Procedures in Student Handbook).

### TENTATIVE COURSE SCHEDULE

<b>Date</b>	<b>Topic(s)</b>	<b>Reading</b>	<b>Written Work Due</b>
W 1/14	Course Introduction	§0.0.2; ch. 1 Introduction; §1.1-1.2	
F 1/16	An Example of a Programmable Object-Oriented System: Karel J. Robot	Karel ch. 1-2	<b>LAB 1</b>
W 1/21	Extending Classes and Defining Methods	Karel ch. 3	
F 1/23	Conditional Instructions	Karel §5.1-5.8	<b>LAB 2</b>
M 1/26	Repetition Instructions	Karel ch. 6 (omit §6.8)	
W 1/28	Introduction to Java; Names	§1.3-1.8; ch. 2	
F 1/30	(ctd)		<b>LAB 3; START PROJECT 1</b>
M 2/2	Working with Numbers	ch. 3	<b>CH 1 EXERCISES</b>
W 2/4	(ctd)		<b>CH 2 EXERCISES</b>
F 2/6	Making Choices	ch. 4	<b>LAB 4</b>
M 2/9	(ctd)		<b>CH 3 EXERCISES</b>
W 2/11	Primitive Types, Operators, and Strings	ch. 5	<b>PROJECT 1</b>
F 2/13	(ctd)		<b>LAB 5</b>
M 2/16	Classes	ch. 6	<b>CH 4 EXERCISES</b>
W 2/18	(ctd)		<b>CH 5 EXERCISES</b>
F 2/20	Control Structures	ch. 7	<b>LAB 6</b>
M 2/23	Declarations and Scope	ch. 8	<b>CH 6 EXERCISES</b>
W 2/25	Active Objects	ch. 9	<b>CH 7 EXERCISES</b>
F 2/27	Interfaces	ch. 10	<b>(Nothing formally due for lab 7); CH 8 EXERCISES</b>
M 3/2	Review and Catch up		<b>PROJECT 2</b>
W 3/4	<b>MIDTERM EXAM (Karel; Bruce ch. 1-8)</b>		
	<i>Spring Break</i>		

M 3/16	Loops (note changed order relative to book)	ch. 13	<b>CH 10 EXERCISES</b>
W 3/18	(ctd)		
F 3/20	Graphical User Interfaces	ch. 11	<b>LAB 8</b>
M 3/23	(ctd)		<b>CH 13 EXERCISES</b>
W 3/25	Recursion	ch. 12	
F 3/27	(ctd)		<b>LAB 9</b>
M 3/30	Arrays	ch. 14	<b>CH 11 EXERCISES</b>
W 4/1	(ctd)		<b>CH 12 EXERCISES</b>
F 4/3	Multi-Dimensional Arrays	ch. 15	<b>LAB 10</b>
M 4/6	(ctd)		<b>CH 14 EXERCISES</b>
W 4/8	Strings and Characters	ch. 16	<b>PROJECT 3</b>
	<i>Easter Break</i>		
W 4/15	(ctd)		<b>LAB 11</b>
F 4/17	Inheritance	ch. 17	<b>LAB 12</b>
M 4/20	(ctd)		<b>CH 15 EXERCISES</b>
W 4/22	(ctd)		<b>CH 16 EXERCISES</b>
Th 4/23	<i>Symposium - no lab</i>		
F 4/24	Exceptions	ch. 18	
M 4/27	Streams	ch. 19	<b>CH 17 EXERCISES</b>
W 4/29	(ctd)		
F 5/1	Searching and Sorting	ch. 20	<b>LAB 13</b>
M 5/4	(ctd)		<b>CH 19 EXERCISES</b>
Tu 5/5	<i>In the rest of the world, today is a Tuesday - but - by administrative decree, at Gordon, today is a Thursday, so lab meets</i>		
W 5/6	Review and Catch Up		<b>(Nothing formally due for Lab 14); PROJECT 4; CH 20 EXERCISES</b>

**TUESDAY, MAY 12 - 8:00-10:00 AM - FINAL EXAM**

Note: Reading assignments in "Karel" are in the Karel J. Robot book on reserve  
All others are in the textbook by Bruce et al.