CS 216: *JAVA Programming*
4 CREDITS

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Course Description
This course is primarily for students majoring in Computer Science and related fields, and continues an introduction to the methodology of programming from an object-oriented perspective. Students will develop programs using built-in, programmer-created, and dynamic data structures. Sorting and search algorithms will be examined to further develop understanding and skills in Java programming. Topics include inheritance, class hierarchy, polymorphism, and abstract and interface classes. The course emphasizes good software engineering principles and fostering intermediate programming skills in the context of a language that supports the object-oriented paradigm.

Prerequisites: CS 112 or permission of the instructor.

Learning Outcomes
Upon successful completion of this course, the student should be able to:
- Specify and develop Java classes using object-oriented design techniques.
- Develop applications in Java using object-oriented design.
- Use *javadoc* and other software engineering tools and techniques to enhance development and documentation of Java programs.
- Utilize nested selection and iteration controls to solve appropriate problems in Java.
- Use fundamental search and sort algorithms to solve appropriate problems in Java.
- Utilize built-in, programmer-created, and dynamic data structures to develop solutions to appropriate programming problems.

Topical Outline
- Review of Objects.
    - UML diagrams. Instance methods. Specify and code a class.
- Review Java basics
    - Using API documentation, javadoc
    - More String methods; class Random
    - Algorithms using iteration and nested controls

- Loop Control: counter vs. sentinel
    - File I/O
    - Examples using sequential search, merge-sort algorithms

- More on Classes & Objects in Java
    - Investigate static class members
    - Develop overloaded methods
    - Passing & returning Objects
    - Investigate toString(); code *myEquals()*
    - Writing a copy constructor & other object copy methods

- More on Classes & Objects in Java, Cont'd.
    - Aggregation
    - ***this***
    - Inner classes
    - Enumerated types
    - garbage collection

- Arrays & related algorithms
    - Binary Search Algorithm
    - Sort Algorithms: Selection sort etc.
    - Big O considered
    - multi-dimensional arrays

- Algorithms using a ***List*** data structure
    - Using Queue and/or Stack
    - Using class ***ArrayList*** data structure

- Text Processing & Wrapper Classes
    - Intro to Wrapper classes
    - More about String objects
    - Tokenizing Strings
    - Wrappers for numeric data
    - Intro to inheritance concepts
    - Superclass constructor call
    - Overriding superclass methods

- Designing with Inheritance & Polymorphism
    - Protected members
    - the Object class
    - Polymorphism
    - Abstract classes and Abstract methods
    - Interfaces

- Exceptions

- Recursive Techniques

Required Text/Materials

- Textbook: Gaddis, Tony; ***Starting Out With Java Early Objects, 4th ed.***
  Addison Wesley: 2011; ISBN-13: 978-0-13-216476-4

USB 2.0 "thumb drive"

- Students should also consider regular "back up" procedures for saving work in progress as a contingency for lost or damaged USB drives during the semester.
- Last-minute losses of work on the date a project or assignment is due will not be excused!

OR

DROPBOX *(or similar)* net-storage account: **www.dropbox.com**

PROs:	**CON**s:
-- FREE (up to 2 GB)	-- must reboot PC or next user will get access to your files!!
-- Nothing to carry or lose	-- there is no guarantee this company won't start charging for accounts someday….
-- Can access from home or school	

- Access to computer (computing lab computers and/or home computer) equipped with ***Java 6.1*** or higher and ***NetBeans*** IDE. (Note: Java and NetBeans are available at no cost.)

- A Cumberland County College student email account is provided to all students. During the initial class meeting(s), instructor will review email set-up to add instructor's email address to the Address Book, maintain a "sent" folder, and (if desired) set the student account to forward received email to a third-party account.
  - All assigned work submitted via email MUST originate from a student CCC email account.
  - Students with non-functioning email accounts (e.g., password doesn't work) will need to drop by the Information Technology department to resolve access issues.

Student Assessment

Three scheduled closed-book "paper and pencil" tests will measure mastery of key concepts through short-answer questions, essay questions, and programming/design problems on paper.

Approximately 6 short, closed-book quizzes will be used to verify preparation and grasp of recently-covered topics. No make-up quizzes are given for missed sessions, but lowest quiz score is dropped from the grade calculation.

A hands-on *Skills Test* will provide an opportunity to demonstrate lab skills and problem-solving ability from design through implementation of working software. Students will independently solve an assigned case problem(s) and submit a solution for grading based on a rubric.

Take-home project(s) will provide students a more in-depth opportunity to demonstrate

problem-solving ability from design through implementation of working software. Students will independently solve an assigned case problem and submit a solution for grading based on a rubric.

A portfolio consisting of homework, lab work and projects establishes progress and mastery of techniques and concepts examined throughout the course.

Basis for Course Grade	**%**	
Tests (3 @15)	**45**	3 tests including final exam.
Skills Test	**15**	hands-on lab test: develop independent solution to a problem
Quizzes	**10**	Approx 6 closed-book quizzes; drop lowest score. No make-ups!
Portfolio:		
Homework	**5**	Assignments to be completed *outside of class*, prior to due date/time.
Labs	**10**	(Will subtract for unproductive lab behaviors!)
Projects……..	**15**	Design and code independently
	100%	

Participation Extra Credit…… +5 pts possible

Instructor may award or add to final grade

- Demonstrate innovative solution or provide unique insights to class.
- Demonstrate significant improvement in subject

The final letter grade will be determined by the following scale:

A (93.0 - 100), A- (90.0 - 92.9) ,
B+ (87.5 - 89.9), B (83.0 - 87.4), B- (80.0 – 82.9),
C+ (77.5 - 79.9), C (70.0 - 77.4),
D(60.0 - 69.9), F(59 and below)

Academic Integrity

Plagiarism is cheating. Plagiarism is presenting in written work, in public speaking, and in oral reports the ideas or exact words of someone else without proper documentation. This also means submitting code written or substantially assisted by others without attribution (such as comments in the code).

Whether the act of plagiarism is deliberate or accidental [ignorance of the proper rules for handling material is no excuse], plagiarism is, indeed, a "criminal" offense. As such, a plagiarized paper or report automatically receives a grade of ZERO and the student may receive a grade of F for the semester at the discretion of the instructor.

Note

If you are having difficulty with work in this class tutoring is available through the Success Center. If think that you might have-a learning disability, contact Project Assist at 856.691.1800, x282 for information on assistance that can be provided to eligible students.

Preparation

This is an academic as well as a "hands-on" course, and students should anticipate a considerable level of effort to satisfactorily complete it. Pursuant to college guidelines, this 4-credit course will entail approximately **6-8 hours per week** of student preparation ***outside class***. Such work includes reading and coding assignments, projects, and homework problems.

This course requires considerable program development on a computer outside of class sessions. The College provides computer lab facilities for student use, but ***access to a computer with an internet connection, at home or work, will likely be very convenient.***

Attendance

Attendance is **expected** at every session, per college policy. You may be asked to substantiate medical and other excuses with further documentation, possibly through the College counseling office. It is unlikely that you can maintain satisfactory performance without good attendance. If you miss a class meeting, it is your responsibility to make up all missed work.

Test Days

If you are unable to attend class on the day of a scheduled test due to an excusable absence, you must contact instructor in advance to schedule a make-up test. Emergency situations where advance notice to instructor is impossible will be handled on a case by case basis strictly according to College criteria for an excusable absence. You are expected to contact the instructor as soon as possible in the event of an emergency.

Late Arrival

Classes and labs will start promptly. You are expected to arrive on time. Students arriving late distract from the pace and quality of instruction, and disrupt the class.

Seating
Usually, students select seats early in the semester and use same seats thereafter. However, **instructor reserves the right to rearrange and/or assign student seating at any time**. If you have a hearing or vision issue, please let instructor know and he will try to adjust seating.

Conduct in Lab
Lab sessions should be informal and educationally rewarding for all. Creative energy often leads to conversations, but courtesy to other students listening to instruction or trying to do work is expected of everyone.

You are expected to focus on the goals of the class. Disruptive behavior, eating, computer game-playing, **internet browsing (except as assigned) and/or "messaging"** are all violations of various school policies and are inappropriate in this class.

Cell phones should be turned OFF (or set to vibrate if required as emergency contact for, e.g., parent with young child at home). TEXT MESSAGING, GAME-PLAYING, SOCIAL NETWORKING (e.g., *Facebook*) IS **PROHIBITED** DURING CLASS AND IN LABS. **These policies will be strictly enforced**. Repeat violations will result in (a) a request to leave classroom for rest of session and/or (b) loss of credit for labs and class work due to inappropriate and unprofessional workmanship.

Early Exit From Sessions
Most students will need all of the scheduled class and lab time to complete assigned work. Moreover, certain announcements, questions, and class instruction may take place throughout the session. Students are therefore expected to remain in the classroom for the scheduled session and leave when class is dismissed. If you have completed all the assigned work, you should look for other students who can benefit from your help, or undertake other, related efforts to advance your knowledge and skills in the course.

Retention of Tests and Projects
Homework assignments (spot-check only) and quizzes will be returned as quickly as possible. Other work--tests and projects-- will be retained by the instructor as a portfolio of student work. This portfolio is useful in evaluating student progress with respect to course content and presentation, and for administrative purposes as part of the school's ongoing accreditation process. All graded tests and projects will be returned for inspection, but must be turned back in before the end of class. Students are responsible for returning their graded papers to the instructor before leaving the room!

"Disruptive Classroom Behavior" Policy
The ***CCC Student Handbook*** (2010-2011 edition, p. 32) states:

> *Students who cause classroom distractions can be considered disruptive by the instructor. When considered to be disruptive, the instructor may temporarily or permanently, if disruption is extreme, excessive or continuous, remove students from his/her class. While different instructors may have different classroom expectations and tolerance levels, avoid confusing one*

*instructor's "level" with another and do notengage in **any** disruptive behaviors. Give yourself every opportunity for success.*

The policy for this class is:

- Instructor shall have final authority in determining what constitutes a "disruptive behavior"

- Disruptive behaviors are not expected in this class!!

- Some examples of disruptive behaviors: (a) constant and inappropriate loud talking during class, (b) texting or use of phone or game-playing during class, (c) talking during a test, (d) frequent trips outside classroom during class to socialize with friends.

- Except in the most extreme cases, the instructor will try to provide some warning and explanation when a student is engaging in a disruptive behavior.

- Failure to heed a warning, or repeating the same disruptive behavior on subsequent occasions, may result in the student being removed from the classroom.

- Removal of a student from class is itself a disruption and stressful to all, and a serious distraction to the business of the class. If a student is removed from the class more than once during the semester, the student will not be permitted to return to class, and the instructor shall have discretion as to final grade based on situation at the time: "X" (instructor withdrawal), "F" (failure), or possibly a grade based on work actually completed to date.