COSC 237 Introduction to Computer Science II

Instructor: Dr. Nam Nguyen**. Email:** npnguyen@towson.edu. **Office:** YR 427. Hours: MTW 1:15 – 2

Exams: Exams are computer-based.

Midterm:	**Jun 18, 2024**	**2 – 5pm**
Final:	**Jul 16, 2024**	**2 – 5pm**

Course Description: This course introduces data structures and their implementations, computer systems concepts, application of data structures in sort and search algorithms and the software development process (TU catalog). This is the second course in a sequence aimed at introducing students to computer science and programming. The emphasis is on object-oriented programming using Java, the design and implementation of abstract data types, recursion, searching and sorting, and non-linear data structures.

Course Objectives: Upon completion of this course, students will be able to:

- Improve program design and coding skills acquired in CS I
- Understand, explain and use fundamental concepts of object-oriented programming, including abstract and generic data types, encapsulation, inheritance, and polymorphism.
- Use this understanding to write object-oriented programs.
- Understand the fundamental programming concepts and use of a variety of data structures, including lists, stacks, queues, and trees.
- Use data structures to solve various computing problems.
- Understand and use basic concepts of algorithmic analysis, with an introduction to the time efficiency of various searching and sorting algorithms.
- Design recursive and iterative solutions to problems.

The overall objective is to provide students object-oriented programming skills and a firm foundation for further study in computer science or information systems.

Prerequisite: COSC 236 (C or better).

Corequisite: MATH 211 or MATH 273. (TU catalog)

Class Organization: This course is crucial for almost any other computer class that you will take in the future, so it is important that you do well. The class will consist of two lectures per week and one lab session. You are strongly encouraged to do all the class work assigned and participate in class discussions.

Students are responsible for reading the lectures before class

Software: The software development environment for the course will be DrJava and it is available in our labs. As these are open labs and you are using public machines, you will want to decide for saving your work (e-mail, USB memory sticks, etc.)

Workload: This class requires object-oriented programming, and this implies a lot of individual work. How much? It depends on your previous exposure to programming, but in principle plan to work 6-8 additional hours per week in the open labs (or at home if you have a computer and the necessary software). There will be 2 tests (a midterm and a cumulative final exam), 4 – 5 programming assignments, and 12 - 13 lab assignments. Students will not be permitted to retain (or copy) exams.

Topics to be covered:

- Review of Java Fundamentals
- Java: User Created Classes

- Java: Inheritance, Polymorphism, Composition, Generics
- ADTs: (Array-Based Lists) Sorted and Unsorted Lists
- ADTs: Stacks, Queues, Linked Lists
- Recursion
- ADTs: (Trees) Binary Trees, Binary Search Trees (BST)

Books and References:
(Main text) *Java Programming, Program Design Including Data Structures*, by D.S. Malik, Thomson Course Technology, 2008.
(Reference, optional) *Building Java Programs: A Back to Basics Approach*, Reges and Stepp, Addison-Wesley, 2013

Software Downloads:
The program development environment used will be DrJava, a Java programming environment developed specially for students. It is available for free download at http://www.drjava.org. In addition, the Java Development Kit (JDK) must be downloaded here.

Grading Policy:

Quizzes	15%
Programming Assignments	25%
Midterm Exam	25%
Final Exam	25%
Labs	10%

NOTE: Towson University uses the +/- grading system. The percentage intervals are as given in the table below:

A: 93	**A-: 90**	**B+: 87**	**B: 83**	**B-: 80**
C+: 75	**C: 70**	**D+: 67**	**D: 60**	**F: <60**

Course Policies / Guidelines:
All course policies are fundamentally intended to sustain an atmosphere that is non-disruptive and conductive to learning.

1. **Academic Integrity** (See the TU Student Academic Integrity Policy): Assignments in this course are of an individual nature and each student is expected to submit work of her/his own creation. The penalty for cheating will consist of a grade of 0 for the dishonest work and the submission of a letter to the Vice President (A statement on cheating and plagiarism distributed to all students may be found in the Towson University Undergraduate Catalog, Appendix H or at http://www.towson.edu/main/academics/ugrad/undergraduatecatalog.asp)

   Avoid situations that could compromise academic integrity. Activities considered to be dishonest: copying an electronic version of someone else's code, even if you change the code before submitting it; copying a section of code from someone else's program; copying source code from the Internet; allowing someone else to copy your code; leaving your work on the hard disk of a lab or library computer.

2. **Lectures: Lectures will be available through Blackboard. It is your responsibility to study them.**

3. **Assignments:** All assignments (along with other course materials) will be posted on Blackboard, so you should check it out before emailing the instructor with any questions pertaining to assignments or daily topics. Keep in mind that the website is not a replacement for class attendance and not every instruction given in class will necessarily be repeated online; again, you should make every effort to attend class on a regular basis. Assignments are due at the beginning of class on the due date. Assignments are expected to be submitted on time regardless of your attendance on a day. **Late assignments will not be accepted for any**

reason. All assignments should be typed and appropriately documented. You will not be graded for any loose sheets turned in. Make sure to staple all the sheets you turn in or to bring them in a folder. **Note** that any deadlines indicate the amount of time and effort required both toward the completion of the assignment and its documentation. Do not anticipate completing your assignments 1-2 days prior to the final deadlines. **Lab assignments:** All labs are subject to grading but not all of them are graded. The instructor will choose randomly 5 labs to grade among all submitted labs. **Students are expected to turn in all labs by the end of the summer session via email namnp.tu@gmail.com**.

4. **Cell phones:** Please ensure that all cell phones, beepers, and any other devices that can potentially disrupt the class are turned off each day upon entering the classroom. Under no circumstances are calls to be made or taken in class! Same rules apply for text messaging.

5. **Very important:** You need to be aware that a commitment of time and effort is necessary if you wish to do well in this course. Learning computer programming is a lot like learning a sport, an instrument, or a foreign language. That is, **you must practice, practice, and practice!!!**

College/University Notes:

1. Students who have a need for special accommodation due to a physical or learning disability should contact the Office for Students with Disabilities at x42638.
2. Please refer to the Student Handbook for the Academic Integrity Policy
3. The Student Handbook specifies that students may not repeat a course more than once without prior permission of the Academics Standards Committee.

COSC 237 Labs Guidelines

1. A lab must be turned in within three days after it takes place (unless otherwise specified in the summer session) via email address: namnp.tu@gmail.com.

2. Create a folder named "*Last_First_LabXX*" where XX is the lab ID, e.g., "*Smith_David_Lab01*" for lab 01.

3. Create a separated file for each programming answer, name them "*LabXX.java*" where XX is the question ID, e.g., "*Lab01.java*" for question 01. For non-programming answers, put your answers in the comment section of any source code (i.e., .java file).

4. Include all your source code and input files in this folder (no .class files should be included).

5. Zip the folder and submit the zipped file via email with subject "*COSC237_Last_First_LabXX*" where XX is the lab ID, e.g., "*COSC237_Smith_David_Lab01*" for lab 01.

Notes

- **NO LATE SUBMISSIONS WILL BE ACCEPTED.**
- Failure to follow the submission guidelines will result in 30% grade deduction.
- All labs must be turned in and are subject to grading except for labs 01 and 02. However, not all of them will be graded. Only five (05) labs, chosen randomly, will be graded.