Prerequisites: Java programming (CMPSCI 121 or equivalent), basic Math skills (R1).
(You must receive a grade of C or better in CMPSCI 121 (or equivalent) in order to enroll in this course.)

Description:
This course introduces basic data structures and their applications using the Java programming language. We will learn the implementation and practical use of several common data structures such as lists, stacks, queues, hash tables, trees, heaps. We will introduce a mathematical framework for evaluating the efficiency of java code. We will then study various algorithms in sorting, searching, and recursion, and how to use appropriate data structures to improve the efficiency of these algorithms.

At the end of this course, students should:
• Be experienced at using common data structures provided by the Java programming language
• Given a reasonably complex problem, write clear programs that correctly solve the problem
• Be able to rigorously analyze the efficiency of a given Java program
• Be familiar with the comparisons and tradeoffs between different data structures

Note that this course WILL require a fair amount of programming efforts. If you are unfamiliar with Java programming, or are uncomfortable with it, please seriously consider whether you should take this course.

Preliminary Test:
During the first class we will have a preliminary test, consisting of several simple Java questions. The purpose of the test is to assess your familiarity with Java, and provide the instructor with a sense of how well you are prepared for the class. The test will NOT count towards your grade. No calculator is required for this test.

Textbooks:
Required:
Recommended read:
Objects, Abstraction, Data Structures and Design, by Koffman.

Topics covered:
• Java programming overview
• Algorithm analysis
• Lists, Stacks, Queues
• Sorting
• Recursion
• Hash tables
• Trees, Graphs
• Heaps
Workload: 6 assignments, 1 midterm exam, 1 final exam, various OWL exercises and quizzes.

Grading:
- Assignments: 50%
- Midterm Exam: 20%
- Final Exam: 25%
- OWL exercises, quizzes: 5%

Course Policy:

- **Intellectual Responsibility.** All assignments, exams, exercises, quizzes must be completed by yourself. If you are found in cheating, plagiarism, or facilitating dishonesty, you WILL get an 'F' for this course. Please refer to the university [Academic Honesty Policy](#) for details.

- **Collaboration.** You are encouraged to discuss class materials and assignment with peers, but the assignments you turn in must be completed by yourself. If you are found in copying code/answers from each other, copying code/answers directly available online, or hiring someone else to do your work, you will be considered violating the honesty policy, and WILL get an 'F' for this course.

- **Late Policy.** All assignments will be collected at 4:00pm on the designated due date. An assignment is considered **late** if it is turned in more than 59 minutes past the due time. You then have 2 days (48 hours) of grace period to complete the assignment, but you will receive deduction of points on your late submission: the deduction is 25% if you turn in one day (24 hours) late, and 50% if you turn in two days (48 hours) late. After the 2-day grace period you will get a zero on the assignment.

  If you are late due to medical conditions and other legitimate excuses, you must document the excuses and contact the instructor via email prior to the due date.

- **Makeup Exams.** Requests for makeup exams MUST be submitted to the instructor at least one week prior to the exam. Only requests with a documented excuse will be accepted.