### Course Objectives

It is sometimes cumbersome to translate abstract ideas to practice. This is the objective of this course to take special care in the formulation of the ideas into algorithms and in the refinements of algorithms into concrete programs that can be applied to practical problems.

### Weekly Schedule

1. **INTRODUCTION TO ALGORITHMS:** Terminology, running time, deterministic and nondeterministic algorithms, polynomial and exponential algorithms, best-case and worst-case analysis.
2. **INTRODUCTION TO ALGORITHMS:** Asymptotic $O$, $\Omega$, and $\Theta$-notations.
3. **INTRODUCTION TO ALGORITHMS:** Asymptotic $o$- and $\omega$-notations, properties of asymptotic notations.
4. **STACKS:** Stack specifications, stack operations including creating an empty stack, push and pop operations, stack overflow and stack underflow conditions.
5. **APPLICATIONS OF STACKS:** Polish notation, conversion of infix expression into Polish notation.
6. **APPLICATIONS OF STACKS:** Expression trees, traversal of binary tree.
7. **QUEUES:** Queue operations, linear and circular array implementations, applications of queues.
8. **1st term week.**
9. **RECURSION:** Principles of recursion, divide and conquer algorithm design technique, the Towers of Hanoii.
10. **RECURSION:** Backtracking algorithm design technique, generating permutations, the eight-queens puzzle.
11. **SEARCH:** Terminology, sequential search, binary search.
12. **SORTING:** Sorting problems, efficient sorting algorithms, insertion sort, bubble sort.
13. **SORTING:** Selection sort, quicksort.
14. **SORTING:** Shell sort, mergesort.

### Textbook(s) / Required Reading


### Recommended Reading

| Grading Criteria | 1st midterm exam – 30%  
|                 | Assignments – 30%  
|                 | Final exam – 40%  |
| Academic Honesty | Individual accountability for all individual work, written or oral. Copying from others or providing answers or information, written or oral, to others is cheating. Providing proper acknowledgment of original author. Copying from another student’s paper or from another text without written acknowledgement is plagiarism. According to University’s bylaws **cheating and plagiarism** are serious offences resulting in a failure from exam or project and disciplinary action (which includes an official warning may appear in student’s transcript or/and suspension from University for up to one semester). |
| Additional Remarks | - Attendance is compulsory. A student not attended exams and 50% of the classes will receive NG grade.  
|                   | - Students are strongly encouraged to attend exams on exam date. One general make-up exam will be given at the end of the semester after the finals. Any student not attended exam on time and provided reasonable excuse within three days following the exam will be able to attend make-up exam. |