



**University of Tehran**

**Tehran**

**Faculty of Computer Engineering**

**Course Description**

***Software Engineering***

**Bachelor Degree**



## Remarks:

According to the Academic Instruction of University, in the academic system, each theoretical credit is presented in 16 or 17 hours, each practical credit in 32 or 34 hours, and each of the workshop credit in 48 hours.

There are some different type of the courses passing by a bachelor/master/Phd student at this university, as listed below:

1. Basic
2. Major
3. Specialized
4. Elective
5. General
6. Workshop
7. Internship
8. Project
9. Optional
10. Pre-university

Each one of these types contain some courses to be passed, according to the educational regulations passed by the Ministry of Science, Research and Technology or Ministry of Health & Medical Education of Iran.

The grading system in this university is from 0 to 20. The minimum passing grade for a course leading to an Associate's Degree or a Bachelor's Degree is 10, for a course leading to a Master's Degree and Medical Sciences is 12 and for a course leading to a PhD Degree is 14.

**Note :** This document has been prepared at **Your Name's** request.



***Title of the Course: General Mathematics 1***

**Number of Credits: 3**

**Type of the Course:** Basic | Theoretical

**Training hours: 51 h Theoretical & 0 h Practical**

**Course Objectives:**

Basic concepts of Calculus and Geometry will be taught to the students in this course which provides necessary background for technical courses.

**Syllabus of Courses:**

Cartesian coordinates; polar coordinates; complex numbers; addition, product, root & geometrical representation of complex numbers; polar representation of complex numbers; function; functions algebra; limit and relevant theorems; infinite limit and limit in infinite; left-hand and right-hand limit; connectivity; derivative; derivation formula; inverse function and its derivative; trigonometric functions derivative and their inverse functions; Rolle's theorem; mean theorem; Taylor expansion; geometrical and physical applications of derivative; curves and acceleration in polar coordinates; application of derivative in approximation of equations roots; definition of integral of continuous functions and piecewise continuous; basic theorems of differential & integral arithmetic; primitive function; approximate methods of integral estimate; application of integral in computation of area, length of curve, moment, center of gravity and labor ....(in Cartesian and polar coordinates); logarithm and exponential function and their derivative; hyperbolic functions; integration methods such as change of variable, component and decomposition of fractions; transform of special variables of sequence and numerical series and relevant theorems; power series and Taylor theorem with remainder.

**TextBooks:**

R.L. Finney, G.B. Thomas, Calculus and Analytic Geometry, Geometry, 9th Edition, Addison Wesley, 1996

***Title of the Course: Islamic Thoughts 1***

**Number of Credits: 2**

**Type of the Course:** General | Theoretical

**Training hours: 34 h Theoretical & 0 h Practical**

**Course Objectives:**

Explain the necessity of Muslim students to pay attention to religion and religious categories, deepen and expand information and strengthen students' theism and faith in the field of theology and resurrection.



***Title of the Course: Algorithms Design***

**Number of Credits: 3**

**Type of the Course:** Major | Theoretical

**Pre-requisite :** Data Structure

**Training hours: 51 h Theoretical & 0 h Practical**

**Course Objectives:**

In this course students will learn to design Efficient and Optimized Algorithms for Computer Programs.

**Syllabus of Courses:**

Review of essential points of Data Structures, problem solving methods (for each methods some problems and special algorithm for the problem shall be represented and being analyzed), introducing to complexity, divide & conquer method (problems to be analyzed: max and min of an array, multiplication of two n-bit number, Strassen method about matrix multiplication, round robin algorithm, sorting with Quicksort algorithm), dynamic programming method (matrix multiplication, traveling sales man problem, polygon triangulation), greedy algorithms(scheduling problem, Huffman Code, making change), methods based one exhaustive search, alpha-beta pruning (puzzle, tic-tac-tac), revelation of methods for problems, graph algorithms(searching methods of graph, Dijkstra algorithms, minimum spanning tree, Floyd algorithm, topological sorting and...), maximum flow networks and other problems.

**TextBooks:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, Third Edition, The MIT Press, Cambridge, Massachusetts 2009.

***Title of the Course: Electrical circuit laboratory***

**Number of Credits: 1**

**Type of the Course:** Major | Practical

**Pre-requisite :** Electrical circuits

**Training hours: 0 h Theoretical & 34 h Practical**

**Course Objectives:**

The purpose of this laboratory is to get acquainted with the performance of measuring devices, voltage sources, electrical quantities such as voltage, current and basic elements of electrical circuits. Students also gain the necessary skills to test and troubleshoot electrical circuits by simulating and implementing experiments designed based on the lessons of the Electrical Circuits.