

The University of Texas at El Paso
Course Syllabus

COURSE DESCRIPTION

Dept., Number	CS1301	Course Title	Introduction to Computer Science
Approval Date	Sept. 2020	Course Coordinator	M. Ceberio

CATALOG DESCRIPTION

Intro to Computer Science: Topics include basic concepts of algorithms, basic computer organization, impacts of computing, and implementation of solutions to computing problems in a high-level programming language. Students will build problem-solving skills, team skills, critical-thinking skills, and professionalism.

TEXTBOOK

Revel for Introduction to Java Programming and Data Structures
By Y Daniel Liang

COURSE OUTCOMES

Level 1. Knowledge and Comprehension:

Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. On successful completion of this course, students will be able to describe, at a high level:

1. The major advances in the history of computing
2. The relation between computing and society, including social, ethical, and legal issues
3. The importance of computing in a variety of professions: required knowledge and skill sets for major career options
4. Classes of programming languages, including:
 - a. Imperative
 - b. Object oriented
 - c. Declarative
 - d. Functional
5. The purpose of multi-dimensional arrays (dimension 3 and above)
6. The purpose of and relationship between classes and objects
7. The purpose of pre/post conditions, in particular as related to verification
8. Compilation and interpretation

Level 2. Application and Analysis:

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:

1. Analyze problems, design, and implement solution algorithms, including correct use of:

- a) User-defined types and their implementation as classes
 - b) Basic string manipulation techniques using language functions, including:
 - a. Traversing strings
 - b. Accessing characters
 - c. Comparing strings
 - d. Concatenating strings
 - c) Algorithm-tracing techniques to ensure solution correctness
2. Use testing and debugging strategies to identify software faults by creating test suites that include:
 - a) Black-box test cases
 - b) Basic white-box test cases
 3. Use general software engineering principles, including abstraction and problem decomposition in problem and solution analysis
 4. Use informal pseudocode to describe algorithms
 5. Use 2D arrays
 6. Apply binary arithmetic to solve problems. This includes:
 - a) Conversion between binary, decimal, and hexadecimal numbers
 - b) Application of arithmetic operations on binary and hexadecimal numbers
 7. Use recursion for solving simple problems
 8. Use linked lists

Level 3. Synthesis and Evaluation:

Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery. On successful completion of this course, students will be able to use the syntax and the semantics of a high-level language to express solution to programming problems, including the pseudocode correct use of:

1. Basic variable types including Booleans, integers, real numbers, characters, strings
2. 1D arrays
3. Assignment and arithmetic
4. Logical propositions to define conditional and loop statements
5. For loops
6. While loops
7. Methods / functions, parameter passing, return values
8. Algorithmic building blocks including:
 - a. Min
 - b. Max
 - c. Average
 - d. Summation
 - e. Linear search

ABET STUDENT OUTCOMES MAPPING

Course Outcomes	Student Outcome
<u>3.3, 3.4</u>	<u>1</u>
<u>2.2</u>	<u>2 (ABET 1)</u>
<u>2.1, 2.4 - 2.8, 3.1 - 3.8</u>	<u>3 (ABET 2)</u>
	<u>4 (ABET 5)</u>
	<u>5 (ABET 4)</u>
	<u>6 (ABET 3)</u>
<u>1.1, 1.2, 1.3</u>	<u>7</u>
	<u>8</u>
<u>1.4, 1.5, 1.6, 1.7</u>	<u>9</u>
<u>2.2, 2.3</u>	<u>10 (ABET 6)</u>

PREREQUISITES BY TOPIC

MATH 1508 or MATH 1411 with "C" or better. CS1101 is a co-requisite.