IST2230A: Introduction to Computer fundamentals and Programming

Course Rational

This course introduces students to computer programming using C++ programming language. C++ is one of today's most popular software development languages and has become the implementation language of choice. C++ form basis of other programming During the course students will learn the basic of C++ languages.

Course Description

This course will put emphasis on fundamentals of programming and control structures. The course also introduces programming in C. Topics include introduction of rudimentary concepts about computers, and the fundamental methodologies and approaches to computer programming in the C/C++ programming languages. The topics covered include the general characteristics of computers, techniques of problem solving using the computer, informal methods to designing algorithms, the C/C++ programming language, and writing, debugging and testing computer programs. In-depth problem solving and programming methodologies using C/C++, considerable emphasis is put on algorithm design as well as on programming in C/C++. Design of algorithms before you can write programs in C/C++is emphasized.

Pre-requisites: IST1020

3 credit Units

Link to University Mission Outcomes

This course is expected to help students develop skills in higher order thinking, global understanding, and multicultural perspective in the students. It is expected to develop proficiency in literacy, preparation for future careers in business management and the ability in the learners to serve the community.

Links To School of Science & Technology Mission Outcomes

This course is designed to

- Develop competence in critical thinking, create skills, use of technology, creativity and good communication skills
- Provide service to the community: Acquire practical working experience through participation and contribution to positive/good community and societal causes
- Demonstrate preparedness for career and lifelong learning in their chosen disciplines as well as understanding of the interdisciplinary nature of knowledge. Demonstrate the use of qualitative and quantitative research skills in Biomedical, Communication and Information Technology
- Apply theories, concepts, and principles found in biological and physical sciences, including a thorough grounding in communication skills in multicultural & global perspectives.
- Demonstrate a thorough understanding of effective, efficient professional and ethical leadership

Program Learning Outcomes

Students will demonstrate the ability and skills to

PLO 2. Write programs using modern programming languages

PLO 3. Demonstrate competence in the use modern tools and techniques.

Course Learning Outcomes

At the end of the course students are expected to:

(i) apply problem solving techniques
(ii) Apply basic control structures
(iii) Appreciate the importance of working with functions and arrays
(iv) To identify and evaluate IT related problems in organizations
(v) Design a program for business organizations
(vi) Write a simple program for business application

Week Number	Topics	Learning Outcomes	Activities/Assignments	Aids/References
Week 1	• Program Planning Concepts • Algorithm • Flow-Chart Pseudo Code Sequence Logic Selection Logic Iteration Logic • Types of Programming Languages • Some Popular Programming Languages • Higher Programming Language Tools Compiler Linker Interpreter Editor MATLAB GUI • Characteristics of good Programming Language	**At the end of the week, students will be able to:** • Appreciate the need of creating algorithm • Apply problem solving techniques	• test Algorithms and Flow-Charts • Assignment of Algorithm and Flowcharts	Ms Word • Reference fundamentals o programming languages by Dipali P. Baviskar • pg 1-16, 2-8
Week 2	• Programming Testing and Debugging Formal program testing Testing vs Debugging Types of Program Errors Developing test plan • Program Documentation • Keywords and Identifiers • Constants • Variables • Operators	**At the end of the week, students will be able to:** • Develop test plan • Apply program standard program documentation • Apply basic control structure • Write simple program	Lab1: displaying message Lab 2: adding numbers Lab 3: test if control Lab 4: test if/else control **Assignment 1:**	Aid: Visual C++ Reference fundamentals of programming languages by Dipali P. Baviskar pg 3-6, 4-3, 5-19 Ref: C++ how to Program by Deitel pg69-87, 133-170

	• Introduction to Control Structure The if statement The if/else statement Nested if/else statement			
Week 3	. • Control Structures While loop Do/while loop For loop Break Statement Continue Statement Case (Switch) control structure	**At the end of the week, students will be able to:** • Apply basic control structure • Write C/C++ program	Lab 5: test while loop Lab 6: test do while Lab7: test switch **Assignment 2:**	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 184-217
Week 4	. **Discussion Topics** • Modular programming • Some Standard Libraries • functions	**Lab 5.1:** Testing Functions without return value **Lab5.2:** Testing Function with return value	Lab8: Test simple function	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 226-257
Week 5	**Discussion Topics** • Parameter passing mechanisms. • Pass by value and by reference	**At the end of the week, students will be able to:** • Write program using functions • Differentiate between pass by value and pass by reference	**Lab 9**: Testing Pass by values in Functions **Assignment 3:**	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 258-268
Week 6	• Recursive Functions	**At the end of the week, students will be able to :** Write recursive functions such as factorial and Fibonacci series	Lab 10: Test Factorial Lab 11: Test Fibonacci series	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 268-280
Week 7	Mid Semester Exam			

Week 8	• User defined data types. • Arrays and structures	**At the end of the week, students will be able to:** • Create a Simple Array program • Test Passing Arrays to Functions • Create One Dimensional Arrays	Lab 12: Simple Array Lab13: One dimensional Array Lab 14: Matrices **Assignments 4:**	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 299-345
Week 9	**Discussion Topics** • Classes as user defined data types • Class Member Functions	**At the end of the week, students will be able to:** • Create class structures • Create program with class structure •	**Lab 15:** Test Members functions defined in the class **Group Project:**	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 96-127
Week 10	• Pointers	**At the end of the week, students will be able to:** • Work with pointers • Appreciate the importance of dynamic arrays	**Lab 10.1**: Creating Pointers **Lab10.2**; Creating Dynamic Pointers (Arrays)	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 362-393
Week 11	• File Processing	**At the end of the week, students will be able to:** • Design program for business organization	**Lab 11.1**: Creating Sequential File	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 627-637
Week 12	• File Processing	**At the end of the week, students will be able to:** • Design program for business organization	**Group Project**	Aid: Visual C++ Ref: C++ how to Program by Deitel pg 627-637
Week 13	Revision and group presentations	**Presentations**	**Presentations**	
Week 14	Final examination			

Course Schedule

Teaching methodology

A practical applications-oriented approach will be used. A wide variety of computational problems will be used to illustrate the use of the different programming techniques.

C++ compilers will be used to translate C++ source code. A combination of lectures, class discussions and laboratory exercises will be used in the course.

Course evaluation

There will be at least two assessed assignments, one mid-term exam and a final exam. In addition, laboratory exercises will be used in the evaluation. Assignments are due 1 week after being handed out and a late assignment will be marked 25% for every subsequent lesson.

Distribution of marks

Attendance and Participation	*5%*
Lab exercises	10%
Lab assignments	20%
Quiz	5%
Project	10%
Mid-term	20%
Final	30%

Course Text

Deitel & Deitel- *C++ How to program*: Prentice hall (Published 2010)

Grading:

90-100	A
87-89	A-
84-86	B+
80-83	B
77-79	B-
74-76	C+
70-73	C
67-69	C-
64-66	D+
62-63	D
60-61	D-
0-59	F