Beni Suef Technological University

Computer Technology Syllabus

Syllabus

Course Title: Computer Technology

Course Code: N/A

Course Followers:

Students of Mechatronics Department in 2nd semester of 1st year

Course Meeting Times

Lectures: 1 session / week, 1 hours / session

Labs: 1 session / week, 3 hours / session

Course Introduction

This course gives Mechatronics students to understanding the syntax and semantics of C programming and developing basic C-programming skills which are the most widely used in Mechatronics industry environment. Students will about numbers, variables, input / output statements, operators, conditional statements, loops, functions, arrays, pointers, structures, and file structures, etc.

Course Objectives

After successfully studying this course, students will be able to:

1. Understand the basic pc-based control principles and abstractions on which the design of mechatronics systems is based. These include basic concepts of c-programming and characteristics of program elements.
2. Use these SW engineering principle to analyze and design simple basic c-programming by the Software tools such as “Visual studio” and “DEV-C++”.
3. Understand the basic functions of the computer used by the manufacturing system.
4. You can see the differences between the past and the present in the field of utilization of computer-based control and the direction of development.
5. Understand the difference between the software and the hardware used in the manufacturing system.
6. Understand and utilize the programming language used in the manufacturing field.
7. Application SW "Visual Studio, DEC-C++" to understand how the coding works for the program you created
8. You can use the C-language to understand the basic learning and menus for writing code.
9. Understand variable declarations for effective utilization of C-language programs, create functions, store data in memory, and perform mathematical and logical functions
10. A selective structure that quarters the control flow of a program according to the value of the logical expression. The program statement can understand and use the control structure using a repetitive structure, such as specifying a repeat execution.
11. By understanding the control structure, you can take advantage of the method of controlling the processing flow of the program or the structure of the sentence used to control such performance.
12. Understanding the control structure, so if you're coding a structured program,
13. Sequential (sequential structure, SEQUENCE type), optional (branch structure, IF THEN ELSE type), There are three types of repetitive (repetitive structure, DO WHILE type).
14. Understand the basic organizing code strategy and understand how to apply it to the control system.
15. Understand how to effectively store data in your memory and how to utilize stored data whenever you need it.
16. Understand dynamic memory allocation or memory dynamic allocation, which is the principle of allocating memory space to use during running time in computer programming.
17. Understand the file processing procedures and methods of c-language that can be used to declare and file pointers, write files, and close files.

Learning Outcomes

1. Understand the structure of modern computers and computer-based thoughts for real life problems
2. Explain the programming rules and C-language grammar
3. Write down C-language codes for problem-solving
4. Distinguish between the concept of variable types and the concept of constant types.
5. It effectively uses conditional grammars such as "if-else" and circular grammars such as "for"
6. Apply the various functions used in the C-language and the concept of annotations and compile to the control program.
7. Use the variables of character type "char" and variables in the integer type "int", and variables in the real type "double" and "bool"
8. The sign operator"+,-"and the four fundamental rule of arithmetic operator"+,-,*, /" and use the increase and decrease operator"++,--", and the logical operator "||,&&,!”
9. Use the sizeof operator and condition selection statement "switch-case-default" and condition circular statement "while -continue-break"
10. Use arrays, memory and pointers when creating control programs
11. Use structure and common grammar to make the program effective when practicing and creating programs
12. Create functions that can allocate memory and copy and move
13. Use pointer in function and use array
14. Create a file with "fopen", write a character to a file with "fputc", or read it as "fgetc".

Prerequisites

Mathematics for Technicians

Application of Math and Science in Technology

Physics for Technicians

Textbooks

The course textbooks are:

1. "Greg Perry and Dean Miller, C Programming ABSOLUTE BEGINNER'S GUIDES (3th edition), QUE, 2013, 800 East 96th Street Indianapolis, Indiana 46240"
2. "LEARN C PROGRAMMING c programming language www.tutorials point.com , 2014"
3. "Noel Kalicharan, Learn to Program with C Learn to Program using the Popular C Programming Language , APRESS, 2015, 233 Spring Street, 6th Floor, New York, NY 10013

Homework

· Homework will be issued in lectures and collected a week later in recitation.

· Corrected homework with solutions will be returned in labs the week after it is collected. You are welcome and encouraged to discuss the homework among your colleagues. However, the final formulation and write up of your homework answers must be your own.

· Submitting homework copied from someone else is a breach of ethics, and will be handled by the Committee on Discipline. More importantly, although homework counts for only 5 percent of the grade, they are critical to learning the material and to doing well on the quizzes and final exam. **One homework problem will appear in each of the tests**, and homework performance will be taken into account during grade assignment for cases that are on letter-grade boundaries.

· **Late homework will not be accepted for grading**. However, total homework grades will be based on the best nine out of eleven individual homework grades. Thus, with one exception, two homework assignments may be missed without a grading penalty.

· All homework will be graded on a coarse scale of 0 to 3 points. 3 points if all or nearly all problems are correct, 2 points if homework is approximately half correct, 1 point if mostly incorrect, and 0 points if late or not submitted.

Labs

- Labs will be conducted during the weeks shown in the schedule. Each lab assignment involves one or more accomplishments which must be checked off by an instructor in the lab. The instructor will be available for help and lab check-off during those weeks in which a lab is in progress.
- No written work will be due for the last lab.
- You are welcome and encouraged to discuss the labs among your colleagues. You are also welcome to team up in pairs to execute a lab. However, the write up of your lab must be done on your own. Skipping the lab and submitting work copied from someone else is a serious breach of ethics, and will be handled by the Committee on Discipline.
- Lab assignments will be graded on a scale of 0 to 3 (3: lab complete, works, good job on pre- and post-lab; 2: lab mostly complete, reasonable job on pre and post lab; 1: lab partially done, marginal to poor job on pre- and post-lab; 0: lab not done, poor job on pre- and post-lab).

Lab Books

- You must obtain the contents of a few pages for every lab (from Lab #1 to lab #13) for output value observations of program calculation output data taken during the in-lab exercises.
- Written pre-lab and post-lab exercises are also to be completed in your own papers.

Midterm Exam

- One closed-book midterm exam will be given in this term. The exam will take place few days after Lab #7 for a two-hour duration.
- There will be no lecture or lab on the day. **You may bring one two-sided sheet of notes written by your own hands to the exam**. You may also bring a calculator, eraser, pencil or ball pens.

Final Exam

- A three-hour final exam will be given during the end-of-term exam week. Timing and room assignments will be announced later. **You may bring three two-sided sheets of notes written by your own hands to the exam**.

Calendar

The calendar provides information on the course's lecture class (L), lab (Lab #), and exam (E) sessions.

SES #	TOPICS	KEY DATES
L1	Introduction computer technology	Homework #1 in
Lab #1	How to using computer	Lab report #1 in
L2	Computer hardware and software	Homework #1 out Homework #2 in
Lab #2	Computer hardware structure and software features	Lab report #1 out Lab report #2 in
L3	Introduction to computer programming & C programming language	Homework #2 out Homework #3 in
Lab #3	Types of computer programs and C-language menus	Lab report #2 out Lab report #3 in
L4	C - basic syntax	Homework #3 out Homework #4 in
Lab #4	Basic syntax and configuration	Lab report #3 out Lab report #4 in
L5	Data type	Homework #4 out Homework #5 in
Lab #5	Data type and number system	Lab report #4 out Lab report #5 in
L6	Variables, Constance	Homework #5 out Homework #6 in
Lab #6	Study and comparison of different variables and types of constants	Lab report #5 out Lab report #6 in
L7	Operators	Homework #6 out Homework #7 in
Lab #7	Study and compare the types of different operators	Lab report #6 out Lab report #7 in

SES #	TOPICS	KEY DATES
E1	**Midterm Exam**	
L8	Conditional statements	Homework #7 out Homework #8 in
Lab #8	Study and compare the types of various conditions	Lab report #7 out Lab report #8 in
L9	Loops	Homework #8 out Homework #9 in
Lab #9	Study and compare the types of various circulatory grammars	Lab report #8 out Lab report #9 in
L10	Functions	Homework #9 out Homework #10 in
Lab #10	Study and comparison of different types of function gramma	Lab report #9 out Lab report #10 in
L11	Arrays	Homework #10 out Homework #11 in
Lab #11	Compare with different arrays	Lab report #10 out Lab report #11 in
L12	pointers	Homework #11 out Homework #12 in
Lab #12	Various pointers and how to use them	Lab report #11 out Lab report #12 in
L13	Structures, File input & output	Homework #12 out Homework #13 in
Lab #13	Use various structures and file input & output	Lab report #12 out Lab report #13 in
E2	**Final Exam**	

Grading (or Assessment) Policy

Initial grading will be based on the following weighting:

ACTIVITIES	PERCENTAGES
Homework	5%
Labs (performance & reports)	35%
Midterm	30%
Final exam	30%

- Lab assignments will be graded on a scale of 0 to 3
  - i) 3: lab complete, works, good job on pre- and post-lab;
  - ii) 2: lab mostly complete, reasonable job on pre and post lab;
  - iii) 1: lab partially done, marginal to poor job on pre- and post-lab;
  - iv) 0: lab not done, poor job on pre- and post-lab.
- All homework will be graded on a coarse scale of 0 to 3 points,
  - i) 3 points if all or nearly all problems are correct,
  - ii) 2 points if homework is approximately half correct,
  - iii) 1 point if mostly incorrect, and
  - iv) 0 points if late or not submitted.

· This will be followed by considerable discussion among the entire teaching staff to factor in your diligence on the homework and labs, and your participation in class and labs. This discussion can affect your letter grade for the course, particularly if your initial grade is on a letter-grade boundary.

· Furthermore, failure to complete the labs in this subject will result in an overall grade that is one letter grade lower (not an Incomplete).

· This subject has been designed so that lectures, homework and labs are integral and essential parts of the learning process. Although there is no specific reward for participation, there is a clearly defined penalty for not participating. Students who consistently miss lectures, homework and labs will not be included in the grading discussions.

Lecture notes

This section contains lecture notes from some chapters of the following books,

"Greg Perry and Dean Miller, C Programming ABSOLUTE BEGINNER'S GUIDEs (3th edition), QUE, 2013, 800 East 96th Street Indianapolis, Indiana 46240"

"LEARN C PROGRAMMING c programming language www.tutorialspoint.com 2014"

LEC #	TOPICS	LECTURE NOTES (BOOK I FOR L1 TO L13 & BOOK II L4 TO L13)
L1	Introduction to computers	BOOK I Introduction
L2	Computer hardware and software	BOOK I Part 1: Jumping Right In
L3	Introduction to computer programming & C programming language	BOOK I Part 1: Jumping Right In Appendixes
L4	C - basic syntax	BOOK I Part 1: Jumping Right In BOOK II Chapter 4 basic syntax
L5	Data type	BOOK I Part 1: Jumping Right In BOOK II Chapter 5 Data type
L6	Variables, Constance	BOOK I Part 1: Jumping Right In BOOK II Chapter 4 Variables, Chapter 4 Constance
L7	Operators	BOOK I Part II: Putting C to Work for You with Operators and Expressions BOOK II Chapter 9 Operators
L8	Conditional statements	BOOK I Part II: Putting C to Work for You with Operators and Expressions BOOK II Chapter 10 Decision making
L9	Loops	BOOK I Part III: Fleshing Out Your Programs BOOK II Chapter 11 Loops
L10	Functions	BOOK I Part V: Files and Functions BOOK II Chapter 12 Functions
L11	Arrays	BOOK I Part IV: Managing Data with Your C Programs BOOK II Chapter 14 Arrays

LEC #	TOPICS	LECTURE NOTES (BOOK I FOR L1 TO L13 & BOOK II L4 TO L13)
L12	pointers	BOOK I Part IV: Managing Data with Your C Programs BOOK II Chapter 15 pointers
L13	Structures, File IN & OUT	BOOK I Part IV: Managing Data with Your C Programs BOOK II Chapter 17 Structures, Chapter 22 File IN & OUT

Lab notes (or Practice Manual)

This section contains lab notes from every chapter of the practice manual,

“LEARN C PROGRAMMING c programming language. Tutorialspoint.com 2014”

LAB #	TOPICS	LAB NOTES (PRACTICE MANUAL CHAPTER)
Lab #1	Introduction to computers	Module 1 Chapter 1
Lab #2	Computer hardware and software	Module 1 Chapter 2
Lab #3	Computer programming & C-programming language	Module 2 Chapter 1, Chapter 2
Lab #4	C - basic syntax	Module 2 Chapter 3
Lab #5	Data type	Module 3 Chapter 1
Lab #6	Variables, Constance	Module 3 Chapter 2
Lab #7	Operators	Module 3 Chapter 3
Lab #8	Conditional statements	Module 3 Chapter 4
Lab #9	Loops	Module 3 Chapter 5
Lab #10	Functions	Module 4 Chapter 1
Lab #11	Arrays	Module 4 Chapter 2
Lab #12	pointers	Module 4 Chapter 3
Lab #13	Structures, File In & Out	Module 4 Chapter 4 Chapter 5