CSCI 515 Fundamentals of Programming

INSTRUCTOR:
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Office Hours: Mon 12pm-2pm, Wed 10am-1pm, other times by appointment only

CLASS MEETINGS:
TR 11:00a-12 :15p
Lab hours : Wed,10:00am - 12:00 am, Jour 102

DESCRIPTION:

This is an advanced programming course using a high level programming language, C and C++. Specific objectives are to introduce the development of algorithms as a disciplined approach to problem solving; to present programming practices in design, coding, debugging, testing and documentation of computer programs; to provide the student with the fundamental knowledge necessary for further study in the field of computational sciences.

REQUIREMENTS AND OBJECTIVES:
Students should be familiar with basic C/C++ coding prior to this class.

STUDENT LEARNING OUTCOMES (to be used in the assessment of this course)

- To understand the internal representation of the various data types.
- To review the language syntax and learn new syntax you have not previously used in programming applications.
- To correctly solve programming problems and learn how to develop algorithms.
- To examine the internal representation of two and three dimension arrays in C/C++.
- To understand dynamic memory allocation, parameter passing, the use of pointers.

<u>MANDATORY</u> TEXTBOOK:
- C++ How to Program (7th Edition), by Paul J. Deitel, Harvey M. Deitel , ISBN-13: 978 0136117261

EVALUATION:
Your grade for the course will be based on the following percentages:

First Test	25%
Second Test	25%
Labs / Assignments	20%
Final Test	30%

Final test might be in any form, a program, such as project presentation, a regular test, or a paper. The instructor will make a decision after a cooperative discussion with the students.

You should do your own work on exams/projects and for computer assignments. Copying another student's work is not acceptable. Any indication of cheating and/or plagiarism on an exam/assignment/project will be an automatic 0 (zero) for the exam/assignment/project for all students involved. Yet, based on cheating and plagiarism activity in any section of class, instructor holds the right to give F grade to the identified student(s). Regarding codes in assignments / projects, you may be required to explain the code you submitted. In case of discursive explanation, the instructor holds the right to lower your grade. You are given many programming assignments during semester. The student submitting other's source code will take -1 for the this specific assignment. A student having more than three -1 cannot gain any point for the Lab/Assignments section of class evaluation. It means that you will automatically lose 30% of your total grade.

Letter grades will be assigned according to the following scale:

A - at least 90% of the total points
B - at least 80% of the total points
C - at least 70% of the total points
D - at least 60% of the total points
F - less than 60% of the total points

STUDENTS WITH DISABILITIES

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library, Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamu-commerce.edu

SMOKE, VAPOR & TOBACCO FREE ENVIRONMENT:

University Procedure 34.05.99.R1 now prohibits the use of vapor/electronic cigarettes, smokeless tobacco, snuff and chewing tobacco inside and adjacent to any building owned, leased, or operated by A&M – Commerce.

ACADEMIC ETHICS:

"All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct). Absolutely no usage of laptops and cellular devices (texting and talking) in class. Talking and other activities that distract/disturb others in the class would not be tolerated. Instructor holds the right to ask you leave the classroom any time based on any of disturbing attitude. Each student should sign the sign-sheet if asked by instructor. Late student may not be allowed to participate the lecture.

ATTENDANCE POLICY:

Attendance is mandatory. Students are expected to be present at all class lectures and are responsible for all material covered in class and assigned in readings.

COURSE REQUIREMENTS and DEADLINES:

Credit will be given for ONLY those exams, programs, and/or projects turned in no later than the deadline as announced by the instructor of this class, unless prior arrangement has been made with the instructor. Late programs/ projects/assignments can or cannot gain partial credit. Credit for late programs/projects/assignments will be announced with the description of it.

Assignments and projects will be posted in university's eCollege communication system. Detailed information will be provided by the instructor. Students also should turn in their assignment through eCollege portal. Each student is responsible for the content/instructions of email communications.

	Content	Assigments
Wk. 1	Introduction, Data types, Cin, Cout,	Lab assg. to be completed in 20 minutes Take-home assg.: limits of data types.
Wk. 2	Decision making, details of loops, string comparison, nested control structures, logical operators, == and =	Lab assg. to be completed in 20 minutes: Find averages of groups of numbers Take-home assg.: Library inventory. Unannounced online quiz
Wk. 3	File Operations, text files, binary files. How to read and write, randomness. Loops to read data from file.	Lab assg. to be completed in two hours Take-home assg.: Library inventory using files
Wk. 4	Functions: Modular programming, pass by reference, pass by value, ARGV details for main() function, memory details of functions.	Lab assg. to be completed in two hours Take-home assg.: Complex Math operation with functions
Wk. 5	Determining the Size of a Data Type, Scope, static variables, function overloading, predefined (system) functions, default arguments	Lab assg. to be completed in two hours Take-home assg.: Student-course exercises to understand given concepts.
Wk. 6	Arrays: Using with different data types, indexes and access to arrays. Applications to images.	Lab assg. to be completed in on hours Take-home assg.: Calculation of standard derivation in number arrays. Calculations in 3D arrays (TAMU-C logo)
Wk. 7	Array operations, add, shift, replace, delete an element, parallel arrays with different data types (basics of structs)	Lab assg. to be completed in two hours Take-home assg.: Frequency calculation from a text file Unannounced online quiz
Wk. 8	Array applications: Search in sorted and unsorted data. Sort algorithms, efficient array size calculation for a given problem	Lab assg. to be completed in two hours Take-home assg.: Sort one million number to see differences in sort algorithms.
Wk. 9	Structs, memory status of structs, arrays in structs, functions with structs.	Lab assg. to be completed in two hours Take-home assg.: Calculation of relative frequency
Wk. 10	Structs, structs in structs, sorting structs, sorting structs in an array.	Lab assg. to be completed in two hours Take-home assg.: Vanity numbers, a departmental courseware.
Wk. 11	Dynamic Programming, Pointers, new and delete operators. Dynamically created arrays, dynamically created pointers.	Lab assg. to be completed in two hours Take-home assg.: Sorting Structs / Arrays using only Pointer
Wk. 12	Dynamic Programming with various scenarios. Friendship network, Facebook problem, Traveler salesman problem,	Lab assg. to be completed in two hours Take-home assg.: TSP
Wk. 13	Dynamic Programming with structs. Pointers to various datatypes,	Lab assg. to be completed in two hours Take-home assg.: Facebook and Movie database
Wk. 14	Templates, pointer based strings, C string and string class.	Lab assg. to be completed in one hours Take-home assg.: String manipulations
Wk. 15	Family tree problem with dynamic programming, recursive functions	Lab assg. to be completed in one hours Take-home assg.: Fibonacci numbers, Factorials
Wk. 16	Review for Final exam, practical examples: constrained sorting, DNA search, bank simulation	Lab assg. to be completed in one hours Take-home assg.: Bonus homework: Parsing a computer program