Reedley College **Fall 2016**

ENGR 40 – Programming for Scientists and Engineers

SYLLABUS

Schedule No	56368	
Class Hours	M,W	2:00 p.m. – 3:15 p.m. (Lecture)
	W	3:30 p.m. – 5:20 p.m. (Lab)
Room No	FEM 3	
Instructor	Sharon Wu	
Phone	638-3641 ex-3497	
Office Hours	M	11 – 11:50 am
	F	12 – 1:50 pm
	or By appointment	
Office	FEM 1D	
E-mail	sharon.wu@reedleycollege.edu	

Course Objectives:

In the process of completing this course, students will:

1. Analyze and explain the behavior of simple programs
2. Modify and expand short programs that use standard conditional and iterative control structures and functions.
3. Design, implement, test, and debug programs that use each of the following: basic computation, simple input/output, standard conditional and iterative structures, user-defined functions, arrays, pointers, classes, and external data files.
4. Choose appropriate conditional and iterative constructs for a given programming task.
5. Apply the techniques of structured (functional) decomposition to break a program into smaller pieces.
6. Describe the mechanics of parameter passing.
7. Create algorithms for solving simple problems.
8. Use pseudocode and flowcharts to describe algorithms.
9. Use strategies that are useful in debugging.
10. Summarize the evolution of programming languages illustrating how this history has lead to the paradigms available today.
11. Describe how data is stored in a computer's memory.
12. Explain the value of declaration models, especially with respect to programming-in-the-large.
13. Identify and describe the properties of a variable such as its associated address, value, scope, persistence, and size.
14. Discuss type incompatibility.
15. Demonstrate different forms of binding, visibility, scoping, and lifetime management.
16. Defend the importance of types and type checking in providing abstraction and safety.
17. Use basic development tools and IDE's for simple software development interfaced with the physical world.
18. Understand and modify software developed by others and evaluate the quality of the modifications.
19. Demonstrate the interplay between software and the physical world.
20. Follow simple software QA procedures.

Learning Outcomes:

Upon completion of this course, students will be able to:

1. Use a high-level programming language to design, implement, test, and debug programs that use each of the following fundamental programming constructs: basic computation, simple input/output, standard conditional and iterative structures, user-defined functions, arrays, pointers, classes, external data files, and the use of interfaces with the physical world.
2. Use pseudocode and a high-level programming language to design, implement, test, and debug algorithms for solving simple problems.
3. Summarize the evolution of programming languages and describe the software development life-cycle.
4. Demonstrate different forms of binding, visibility, scoping, and lifetime management.
5. Demonstrate how one may combine software and hardware components in order to respond to physical phenomena and manipulate the physical world.
6. Solve application problems in science and engineering.

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Course Outline:

1. Programming Languages; Simple C++ programs; Declarations and Types
2. Control structure: Selection
3. Control structure: Repetition
4. Working with data files
5. Modular programming with functions
6. One-dimensional arrays
7. Two-dimensional arrays
8. An introduction to pointers
9. An Introduction to Classes
10. Algorithms and Problem Solving
11. Interface With the Physical World

Lab Content:

1. Programming assignments to practice the following concepts and topics:
    1. Basic computations and C++ functions
    2. Simple input/output
    3. Conditional and iterative structures
    4. Data files
    5. User-defined functions
    6. One and two-dimensional arrays
    7. Pointers
    8. User-defined Classes
2. Assignments that involve the interface of software with the physical world
    1. Sensors
    2. Controllers

Course Prerequisite:

MATH 4A - Trigonometry or MATH 4C - Trigonometry/Precalculus and eligibility for English 25 and English 26.

Textbook:

Use one of the following textbook:

1. Starting out with C++ From Control Structures through Objects, 8th Ed, Brief Version. By Tony Gaddis, Pearson
2. Starting out with C++ From Control Structures through Objects, 8th Ed, By Tony Gaddis, Pearson

Learning Management System (LMS) - Canvas:

Canvas is used to post announcements, course information, programming assignments, and grade. You will submit your programming assignments on Canvas.

To log-in Reedley College Canvas:

User name:
Password: (* Be sure to change your password after you login)

Computer Lab:

Computer lab is in room FEM 4E. Computers (IBM compatible) and printers are used in this lab. Visual C++ compiler is used for this class.

Homework Assignment:

Homework is assigned for each chapter. Homework is due after the chapter is completed. Each assignment is worth 10 points and will be graded on **correctness, completeness, neatness**, and **effort** of the entire assignment. Points will be deducted for late homework. Homework should be done on 8.5" by 11" lined paper, stapled on upper left hand corner, with your name and chapter/section number written on the upper right hand corner.

Lab Assignments:

Lab assignments are assigned before each lab session. You will complete the lab assignment at end of the two-hour lab period. Turn in the lab assignment on LMS-Canvas at end of each lab.

Submit your **program** (source code only, no executable file) and program input/output on Blackboard. Programs are graded using following criteria: **documentation, readability, correctness,** and **test case results**.

There are programming assignments using Arduino microprocessor to interface with sensors and devices.

Programming Projects:

There will be additional programming assignments which will be completed outside the class lab sessions. Due dates will be indicated on the assignments.

Other Programming Applications:

There are other software allow you to learn programming concepts. For example: Alice, Processing, and Java. One of these software will be introduced and assignments given for the class.

Tests:

There is a written test every two or three chapters. Each test is 100 points. Early tests can be arranged with a very good reason. A more **difficult** late test can only be arranged if you have an excuse verified by an impartial party (i.e., a doctor or a court note).

Grading:

50% of the final grade points are from the average score of all chapter tests.
30% of the final grade points are from the average score of all lab assignments.
10% of the final grade points are from the average score of homework assignments.
10% of the final grade points are from programming term projects.

Final grade is assigned using following scale:

90-100	points	A	60- 69	points	D
80- 89	points	B	< 60	points	F
70- 79	points	C			

If you have perfect attendance and your grade is within 1 point (or 1%) of the next higher letter grade, the instructor will award you the next higher letter grade.

Attendance (Also see Attendance Policy under Academic Regulations in Class Schedule):

Attendance will be taken at beginning of each class. Students, who leave the class before the end of class, will be counted as tardy. Two tardiness count as one absence. Your classmates and I would greatly appreciate that you take care of your personal needs (i.e., using the restroom, getting a drink…etc.) before the class begins.
Students will be dropped from the class if they fail to attend the first class session of the semester. During the semester up to final drop date, any student who missed more than two weeks of class meetings (cumulative) will be dropped from this class (**6** classes).

Student Conduct (Also see Student conduct under Campus Policies in Class Schedule):

Students are expected to conduct themselves in a responsible manner in the classroom. Specific rules and regulations have been established in Board Policy 5410. A copy of this policy is available in the college library, the Admissions Office, the Vice President of Student Services, the Vice President of Instruction's Office, and in the Student Activities Office. Failure to adhere to the accepted standards will result in disciplinary action.

Accommodations for students with disabilities:

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

<u>Plagiarism and Cheating Policy</u> (See Cheating and Plagiarism under Campus Policies)<u>:</u>

Cheating and plagiarism is prohibited in the class. Incidents of cheating and plagiarism will result a failing grade on the particular examination or assignment in question.

<u>Important Dates:</u>

Class begin	Monday	08/15/2016
Last day to register	Friday	09/02/2016
Last day to drop this class to avoid a "W"	Friday	09/02/2016
Last day to change to/from a Pass/No-Pass grading basis	Friday	09/09/2016
Last date to drop this class	Friday	10/14/2016
No classes:		
Labor Day	Monday	09/05/2016
Veterans Day	Friday	11/11/2016
Thanksgiving	Th & F	11/24 – 11/25/2016
Final Exam	**Monday**	**12/11/2016** **2:00 pm – 3:50 pm**