



Course Syllabus

COSC 1437 - Programming Fundamentals II

Catalog Description: This course contains further applications of programming techniques in the “C” programming language. Topics may include file access methods, data structures and modular programming, program testing and documentation, and other topics not normally covered in an introductory computer programming course.

Prerequisites: COSC 1436

Semester Credit Hours: 4

Lecture hours = 3, Lab hours = 3

Contact Hours per Semester: 96

State Approval Code: 11.0201.53 07

Course Subject/Catalog Number: COSC 1437

Course Title: Programming Fundamentals II

Course Curriculum: State Criteria (those marked with an X reflect the state-mandated competencies taught in this course)

Basic Intellectual Competencies in the Core Curriculum

- Reading
- Writing
- Speaking
- Listening
- Critical thinking
- Computer literacy

Perspectives in the Core Curriculum

- Establish broad and multiple perspectives on the individual in relationship to the larger society and world in which he/she lives, and to understand the responsibilities of living in a culturally and ethnically diversified world.
- Stimulate a capacity to discuss and reflect upon individual, political, economic, and social aspects of life in order to understand ways in which to be a responsible member of society.
- Recognize the importance of maintaining health and wellness.
- Develop a capacity to use knowledge of how technology and science affect their lives.
- Develop personal values for ethical behavior.
- Develop the ability to make aesthetic judgments.
- Use logical reasoning in problem solving.
- Integrate knowledge and understand the interrelationships of the scholarly disciplines.

Core Components and Related Exemplary Educational Objectives

Communication (composition, speech, modern language)

The objective of a communication component of a core curriculum is to enable the student to communicate effectively in clear and correct prose in a style appropriate to the subject, occasion, and audience.

- To understand and demonstrate writing and speaking processes through invention, organization, drafting, revision, editing, and presentation.
- To understand the importance of specifying audience and purpose and to select appropriate communications choices.
- To understand and appropriately apply modes of expression, i.e. descriptive, expository, narrative, scientific, and self-expressive, in written, visual, and oral communication.
- To participate effectively in groups with emphasis on listening, critical and reflective thinking, and responding.
- To understand and apply basic principles of proficiency in the development of exposition and argument.
- To develop the ability to research and write a documented paper and/or to give an oral presentation.

Mathematics

The objective of the mathematics component of the core curriculum is to develop a quantitatively literate college graduate. Every college graduate should be able to apply basic mathematical tools in the solution of real-world problems.

- To apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.
- To represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.
- To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.
- To use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.
- To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
- To recognize the limitations of mathematical and statistical models.
- To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.

Natural Sciences

The objective of the study of a natural sciences component of a core curriculum is to enable the student to understand, construct, and evaluate relationships in the natural sciences, and to enable the student to understand the bases for building and testing theories.

- To understand and apply method and appropriate technology to the study of natural sciences.
- To recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
- To identify and recognize the differences among competing scientific theories.
- To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

Humanities and Visual and Performing Arts

The objective of the humanities and visual and performing arts in a core curriculum is to expand students'

knowledge of the human condition and human cultures, especially in relation to behaviors, ideas, and values expressed in works of human imagination and thought. Through study in disciplines such as literature, philosophy, and the visual and performing arts, students will engage in critical analysis, form aesthetic judgments, and develop an appreciation of the arts and humanities as fundamental to the health and survival of any society. Students should have experiences in both the arts and humanities.

- To demonstrate awareness of the scope and variety of works in the arts and humanities.
- To understand those works as expressions of individual and human values within an historical and social context.
- To respond critically to works in the arts and humanities.
- To engage in the creative process or interpretive performance and comprehend the physical and intellectual demands required of the author or visual or performing artist.
- To articulate an informed personal reaction to works in the arts and humanities.
- To develop an appreciation for the aesthetic principles that guide or govern the humanities and arts.
- To demonstrate knowledge of the influence of literature, philosophy, and/or the arts on intercultural experiences.

Social and Behavioral Sciences

The objective of a social and behavioral science component of a core curriculum is to increase students' knowledge of how social and behavioral scientists discover, describe, and explain the behaviors and interactions among individuals, groups, institutions, events, and ideas. Such knowledge will better equip students to understand themselves and the roles they play in addressing the issues facing humanity.

- To employ the appropriate methods, technologies, and data that social and behavioral scientists use to investigate the human condition.
- To examine social institutions and processes across a range of historical periods, social structures, and cultures.
- To use and critique alternative explanatory systems or theories.
- To develop and communicate alternative explanations or solutions for contemporary social issues.
- To analyze the effects of historical, social, political, economic, cultural, and global forces on the area under study.
- To comprehend the origins and evolution of U.S. and Texas political systems, with a focus on the growth of political institutions, the constitutions of the U.S. and Texas, federalism, civil liberties, and civil and human rights.
- To understand the evolution and current role of the U.S. in the world.
- To differentiate and analyze historical evidence (documentary and statistical) and differing points of view.
- To recognize and apply reasonable criteria for the acceptability of historical evidence and social research.
- To analyze, critically assess, and develop creative solutions to public policy problems.
- To recognize and assume one's responsibility as a citizen in a democratic society by learning to think for oneself, by engaging in public discourse, and by obtaining information through the news media and other appropriate information sources about politics and public policy.
- To identify and understand differences and commonalities within diverse cultures.

Instructional Goals and Purposes:

The purpose for this course is to provide students with an intermediate level of programming necessary for all computer science majors. It builds on the foundations of COSC1436 from using classes to developing class libraries. It provides essentials for the next computer science courses such as the data structures course. It is a must for the computer programmer and information systems analyst.

Learning Objectives:

1. Design and code programs using the flowchart or algorithm design technique and the C++ language.
2. Use structured procedural and object oriented programming techniques to develop programs.
3. Design, test and decode programs while working in a program development environment.
4. Demonstrate the use of software engineering techniques in solving a programming problem.

Specific Course Objectives (includes SCANS):

After studying the material presented in the text and online, the student should be able to complete all behavioral/learning objectives listed below with a minimum competency of 70% on assignments and exams.

- 1) **Design and code programs using the flowchart or algorithm design technique and the C++ language.** (1a-i, 1a-iv, 1b-i, 1b-iii, 1b-iv, 1b-vi, 2c-i, 2c-ii, 2c-iii, 2c-iv, 2d-iii)
 - a) Write a simple computer C++ program using basic input and output statements.
 - b) Write programs involving arithmetic operators.
 - c) Use selection structure to choose among alternative actions.
 - d) Use repetition structure to execute statements in a program repeatedly.
- 2) **Use structured procedural and object oriented programming techniques to develop programs.** (1a-i, 1a-ii, 1a-iv, 1b-iii, 1b-vi, 2c-i, 2c-ii, 2c-iii, 2c-iv)
 - a) Write programs that create, use and destroy class objects.
 - b) Develop programs that convert objects of one class to another class.
 - c) Design program problem solutions using array data structure for list and tables.
 - d) Declare, initialize, sort and search an array.
 - e) Define pointers and pass arguments using pointers.
- 3) **Design, test and decode programs while working in a program development environment.** (1a-i, 1a-iv, 1b-i, 1b-iii, 1b-iv, 1b-vi, 2c-i, 2c-ii, 2c-iii, 2c-iv, 2d-iii)
 - a) Demonstrate the ability to create, compile, execute, and debug programs in a program development environment such as Visual C++ or Dev C++.
 - b) Understand basic problem-solving techniques, such as stepwise refinement.
 - c) Code and test simple decision-making statements.
 - d) Code and test sentinel-controlled and counter-controlled repetitions.
 - e) Write programs that use dynamic memory operators.
- 4) **Demonstrate the use of software engineering techniques in solving a programming problem.** (1a-i, 1a-iv, 1b-iv, 1b-vi, 2c-i, 2c-ii, 2c-iii, 2c-iv)
 - a) Construct programs modularly from pieces called functions.
 - b) Write programs that utilize the mechanisms to pass information between functions.
 - c) Understand the concepts of data hiding and encapsulation.

Course Content:

Students in all sections of "C" Programming II will be required to do the following:

1. Students will submit computer programs for each learning module of the course. Each program must demonstrate comprehensive knowledge of the learning module represented.
2. Students will assemble a portfolio of programming projects to be submitted at the end of the semester.
3. Students will conduct an interactive presentation of a comprehensive programming project subject to peer and instructor evaluation.

Methods of Instruction/Course Format/Delivery:

Students in both the traditional class and in the Internet class will have access to this course via WebCT. Students in the traditional class will meet regularly for lecture over the material. Students in the Internet class will only be required to meet with the instructor for testing; however, Internet students are always

welcome to attend the traditional class (especially for exam reviews). Resources provided through WebCT include

- A calendar displaying assignments each week (please check often)
- Online assignments
- Chapter notes
- Email (totally contained within WebCT)

All assignments will be submitted through WebCT. After the assignment has been graded, the student will be able to view his or her grade by returning to the assignment and clicking the View Scores button or by clicking the My Grades link in the left banner. All exams will be hands-on application tests and students will not be able to view the answers to the exams online; however, they will be able to see their grade in My Grades and drop by the office to review their exams. I generally will have your work graded and posted within two days following the deadline.

Students in both the traditional and Internet classes should use the Email within WebCT to communicate with the instructor. Using WebCT email gives you access to the instructor and other classmates without having to remember or type email addresses—you just select a name from the list. If you are not able to contact me using email in WebCT, you may use my Panola College email address. I attempt to respond to all email within 24 hours. If you make an appointment with me through email to take an exam, for example, I will reply to your email—if I do not reply you should send your email to me again or call me. Please always include a subject line and your name in your email.

Assessment:

The following items will be assigned during the semester and used to calculate the student's final grade:

- **ASSIGNMENTS**
We will work through each of the learning modules which correspond to the chapters in your textbook. At the end of each learning module, you will complete a programming project demonstrating your knowledge of the programming concepts presented in the learning module. Program source code will be submitted to me according to the schedule provided using the online drop box in the Assignments link of WebCT.
- **PORTFOLIO**
The portfolio will be a collection of all program source code developed during the semester including a comprehensive programming project to be completed in the final weeks of the semester.

Portfolios are due by the scheduled deadline.
- **EXAMS**
There will be one assessment to verify that you have the comprehensive knowledge required to produce your portfolio. You will demonstrate this knowledge by conducting an interactive presentation of a comprehensive programming project subject to peer and instructor evaluation.

Course Grade:

The grading scale for this course is as follows:

- Assignments – 20%
- Portfolio – 50%
- Exams – 30%

All of your grades including a mid-semester and final grade will be posted to My Grades in WebCT.

Texts, Materials, and Supplies:

- Optional: *Learning to Program with Alice* by Wanda Dann, Stephen Cooper, and Randy Pausch, Course Technology, ISBN: 0-13-187289-3 (Textbooks will change to reflect current software version)
- Required: *An Introduction to Programming With C++, Fifth Edition* by Diane Zak, 2007, Course Technology, ISBN 10: 1-4188-3618-4
- Access to a computer and the Internet

- Student data files and Dev-C++ are provided with the textbook

Other:

- For current texts and materials, use the following link to access bookstore listings: <http://www.panola.edu/collegestore.htm>
- For testing services, use the following link: <http://www.panola.edu/instruction/dl/testing.htm>

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