



CREDIT COURSE OUTLINE

I. COVER PAGE

(1) CSCI 40	(2) PROGRAMMING CONCEPTS AND METHODOLOGY I	(3) 4
Number	Title	Units

<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3">(4) Lecture / Lab Hours:</td> </tr> <tr> <td colspan="3">Total Course Hours</td> </tr> <tr> <td style="width: 30%;">Total Lec hours:</td> <td style="width: 10%;"></td> <td style="width: 60%; text-align: right;">54.00</td> </tr> <tr> <td>Total Lab hours:</td> <td></td> <td style="text-align: right;">36.00</td> </tr> <tr> <td>Total Contact hours:</td> <td></td> <td style="text-align: right;">90.00</td> </tr> <tr> <td colspan="3">Lec will generate <u>0</u> hour(s) outside work.</td> </tr> <tr> <td colspan="3">Lab will generate <u>0</u> hour(s) outside work.</td> </tr> <tr> <td>(5) Grading Basis:</td> <td>Grading Scale Only</td> <td></td> </tr> <tr> <td></td> <td>Pass/No Pass option</td> <td style="text-align: center;">X</td> </tr> <tr> <td></td> <td>Pass/No Pass only</td> <td></td> </tr> <tr> <td>(6) Advisories:</td> <td colspan="2">Eligibility for English 126</td> </tr> <tr> <td></td> <td colspan="2">Eligibility for English 125</td> </tr> <tr> <td>(7) Pre-requisites(requires C grade or better):</td> <td colspan="2">MATH 4A or MATH 4C</td> </tr> <tr> <td>Corequisites:</td> <td colspan="2"></td> </tr> </table>	(4) Lecture / Lab Hours:			Total Course Hours			Total Lec hours:		54.00	Total Lab hours:		36.00	Total Contact hours:		90.00	Lec will generate <u>0</u> hour(s) outside work.			Lab will generate <u>0</u> hour(s) outside work.			(5) Grading Basis:	Grading Scale Only			Pass/No Pass option	X		Pass/No Pass only		(6) Advisories:	Eligibility for English 126			Eligibility for English 125		(7) Pre-requisites(requires C grade or better):	MATH 4A or MATH 4C		Corequisites:			<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3">(8) Classification:</td> </tr> <tr> <td style="width: 30%;"></td> <td style="width: 30%;"></td> <td style="width: 40%;"></td> </tr> <tr> <td></td> <td>Degree applicable:</td> <td style="text-align: center;">X</td> </tr> <tr> <td></td> <td>Non-degree applicable:</td> <td></td> </tr> <tr> <td></td> <td>Basic skills:</td> <td></td> </tr> <tr> <td>(9)RC</td> <td>Fulfills AS/AA degree requirement: (area)</td> <td></td> </tr> <tr> <td></td> <td>Computer Familiarity</td> <td></td> </tr> <tr> <td></td> <td>General education category:</td> <td></td> </tr> <tr> <td></td> <td>Major: COMPUTER SCIENCE</td> <td></td> </tr> <tr> <td></td> <td>Certificate of:</td> <td></td> </tr> <tr> <td></td> <td>Certificate in:</td> <td></td> </tr> <tr> <td>(10)CSU</td> <td>Baccalaureate:</td> <td style="text-align: center;">X</td> </tr> <tr> <td>(11)Repeatable: (A course may be repeated three times)</td> <td></td> <td style="text-align: center;">0</td> </tr> </table>	(8) Classification:							Degree applicable:	X		Non-degree applicable:			Basic skills:		(9)RC	Fulfills AS/AA degree requirement: (area)			Computer Familiarity			General education category:			Major: COMPUTER SCIENCE			Certificate of:			Certificate in:		(10)CSU	Baccalaureate:	X	(11)Repeatable: (A course may be repeated three times)		0
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(12) Catalog Description: This course introduces problem solving, algorithm development, procedural and data abstraction using C language; program design, coding, debugging, testing, and documentation.
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II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

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

- A. Formulate, represent, and solve problems using a high level programming language.
- B. Demonstrate knowledge of high level language syntax, control structures, looping, arrays, files, and records.
- C. Demonstrate proper programming style, debugging and testing techniques.
- D. Solve application problems in science and engineering.

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

- A. Write computer programs using a high level programming language (C Language)
- B. Write computer programs using selection and repetition control structures
- C. Write computer programs using pointer and array data structures
- D. Write computer programs using functions

- E. Write computer programs to get input from files and write output to files.
- F. Compile and link C programs to create executable programs
- G. Identify and correct syntax and logical errors in computer programs
- H. Create proper test cases to test computer programs
- I. Write a total of 500 to 1000 lines of programs.

IV. COURSE OUTLINE:

Lecture Content:

A. Programming Fundamentals (PF)

a) Fundamental programming constructs (PF1)

Minimum coverage time: 10 hours

Topics:

1. Basic syntax and semantics of a higher-level language
2. Variables, types, expressions, and assignment
3. Simple I/O
4. Conditional and iterative control structures
5. Functions and parameter passing
6. Structured decomposition

b) Algorithms and problem-solving (PF2)

Minimum coverage time: 6 hours

Topics:

1. Problem-solving strategies
2. The role of algorithms in the problem-solving process
3. Implementation strategies for algorithms
4. Debugging strategies
5. The concept and properties of algorithms

c) Fundamental data structures (PF3)

Minimum coverage time: 5 hours

Topics

1. Primitive types
2. Arrays
3. Records
4. Strings and string processing
5. Pointers and references

d) Recursion (PF4)

Minimum coverage time: 1 hour

Topics

1. The concept of recursion
2. Simple recursive procedures

B. Programming Language (PL)

a) Overview of programming languages (PL1)

Minimum coverage time: 1 hour

Topics

1. History of programming languages
2. Brief survey of programming paradigms
 - Procedural languages
 - Object-oriented languages

b) Declarations and types (PL4)

Minimum coverage time: 1.5 hours

Topics

1. The conception of types and a set of values with together with a set of operations.
2. Declaration models (scope and lifetime)
3. Overview of type-checking

c) Abstraction mechanisms (PL5)

Minimum coverage time: 4 hours

Topics

1. Procedures, functions, and iterators as abstraction mechanisms
2. Parameterization mechanisms (reference vs. value)
3. Modules in programming languages

C. Discrete Structures (DS)

a) Basic logic (DS2)

Minimum coverage time: ½ hours

Topics:

1. Logical connectives (and, or, not)
2. Truth tables (and, or, not)

D. Algorithms and Complexity (AL)

a) Algorithmic strategies (AL2)

Minimum coverage time: 2 hours

Topics:

1. Brute-force algorithms
2. Divide-and-conquer

b) Fundamental computing algorithms (AL3)

Minimum coverage time: 1 hour

Topics:

1. Sequential and binary search algorithms

E. Social and Professional Issues (SP)

a) History of computing (SP1)

Minimum coverage time: ½ hours

Topic:

1. History of computer hardware, software, networking

Lab Content:

Program assignments practice following concepts and topics:

- A. C language overview
- B. Using C Standard Library functions
- C. User defined functions
- D. Condition Control Structures
- E. Repetition structures
- F. Fundamental data structure - Arrays
- G. Text File Processing

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

A. Sample Text Title:

- 1. Recommended - Deitel *C How to Program*, ed. 6 Prentice Hall, 2010, Programming assignments are included in the text
- 2. Recommended - Hanly and Koffman *Problem Solving & Program Design in C*, ed. 6 Pearson, 2009, Programming assignments are included in the text
- 3. Recommended - Etter *Engineering Problem Solving with C*, ed. 3 Pearson, 2005, Programming assignments are included in the text

B. Other Readings

- 1. Recommended - *Lab Handouts by Instructor*

Global or international materials or concepts are appropriately included in this course

Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing Check either 1 or 2 below	
X	1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.

	a) essay exam(s)	X	d) written homework
	b) term or other paper(s)		e) reading reports
	c) laboratory report(s)	X	f) other (specify)

Required assignments may include but are not limited to the following:

Writing Homework Example:

Formulate a pseudocode algorithm to obtain a series of positive numbers from the keyboard, and determine and display the sum of the numbers.

Writing Computer Program Example

Write a C program to generate a table of conversions from inches to centimeters. Start the inches column at 0.0 and increment by 0.5 in. The last line should contain the value 20.0 in. (1 in = 2.54 cm)

B. Problem Solving			
Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)		d) laboratory reports
	b) quizzes		e) field work
X	c) homework problems	X	f) other (specify):

Required assignments may include but are not limited to the following:

Exam/Homework Problems

1. True/False questions
2. Fill-in the blanks
3. Identify and correct the errors in C statements
4. Write section of C code to perform certain task

Programming Assignments

Write a program to calculate student grade point average (GPA).

Write a program to print a temperature conversion table (from Fahrenheit to Celsius)

C. Skill demonstrations, including:			
	a) class performance(s)		c) performance exams(s)
	b) field work	X	d) other (specify)

Required assignments may include but are not limited to the following:

Programming skill example:

1. Develop algorithms through the process of top-down, stepwise refinement.
2. Identify and debug syntax and logical errors in programs.

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false	X	e) other (specify):
	c) matching items		

COURSE GRADE DETERMINATION:

Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in

determining student final grades.
 Example #1 of a grading system
 30% Exams
 20% Final Projects
 50% Weekly Homework and Programs

Example #2 of a grading system
 50% Exams
 10% Final Projects
 20% Homework Assignments
 20% Programming Lab Assignments

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met	
	YES	NO
Textbook	<u> X </u>	<u> </u>
Reference materials	<u> </u>	<u> X </u>
Instructor-prepared materials	<u> </u>	<u> X </u>
Audio-visual materials	<u> </u>	<u> X </u>

Indicate Method of evaluation:

Used readability formulae (grade level 10 or higher)	<u> </u>
Text is used in a college-level course	<u> X </u>
Used grading provided by publisher	<u> </u>
Other: (please explain; relate to Skills Levels)	<u> </u>

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u> X </u>	<u> </u>
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	<u> X </u>	<u> </u>
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	<u> X </u>	<u> </u>
Requires independent thought and study	<u> X </u>	<u> </u>
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	<u> X </u>	<u> </u>

List of Reading/Educational Materials

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Recommended - Hanly and Koffman *Problem Solving & Program Design in C*, ed. 6 Pearson, 2009, Programming assignments are included in the text

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Comments:

 This course requires special or additional library materials (list attached).

 X This course requires special facilities:
 Computer Lab / Computers and Printers

Attached Files:

BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least <u>three</u> major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.	
(eligibility for English 126)	1. Students must read and understand a college level computer science

<p>(as outcomes for English 262)</p> <p><input checked="" type="checkbox"/> Using phonetic, structural, contextual, and dictionary skills to attack and understand words.</p> <p><input checked="" type="checkbox"/> Applying word analysis skills to reading in context.</p> <p><input checked="" type="checkbox"/> Using adequate basic functional vocabulary skills.</p> <p><input checked="" type="checkbox"/> Using textbook study skills and outlining skills.</p> <p><input checked="" type="checkbox"/> Using a full range of literal comprehension skills and basic analytical skills such as predicting, inferring, concluding, and evaluating.</p>	<p>text.</p> <p>2. Students must read and understand software manuals.</p> <p>3. Students must read and understand complex problem statements.</p>
<p>(eligibility for English 125) (as outcomes for English 252)</p> <p><input checked="" type="checkbox"/> Writing complete English sentences and avoiding errors most of the time.</p> <p><input checked="" type="checkbox"/> Using the conventions of English writing: capitalization, punctuation, spelling, etc.</p> <p><input checked="" type="checkbox"/> Using verbs correctly in present, past, future, and present perfect tenses, and using the correct forms of common irregular verbs.</p> <p><input checked="" type="checkbox"/> Expanding and developing basic sentence structure with appropriate modification.</p> <p><input checked="" type="checkbox"/> Combining sentences using coordination, subordination, and phrases.</p> <p><input checked="" type="checkbox"/> Expressing the writer's ideas in short personal papers utilizing the writing process in their development.</p>	<p>1. Student must document their programs using written descriptions of their algorithms.</p> <p>2. Students must take lecture notes.</p> <p>3. Students must take written test as part of the evaluation process.</p>
<p><u>Check the appropriate spaces.</u></p> <p><input type="checkbox"/> Eligibility for Math 101 is advisory for the target course.</p> <p><input checked="" type="checkbox"/> Eligibility for English 126 is advisory for the target course.</p> <p><input checked="" type="checkbox"/> Eligibility for English 125 is advisory for the target course.</p> <p><i>If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.</i></p>	

CONTENT REVIEW

MATH 4C TRIGONOMETRY/PRECALCULUS

MATH 4A TRIGONOMETRY

REQUISITES

Subject Prerequisite -- MATH 4A TRIGONOMETRY

- | | |
|---|---|
| <p>1. Students learn and use the concept of mathematical functions.
2. Students learn to use the six basic trigonometric functions of $\sin(x)$, $\cos(x)$, $\tan(x)$, $\cot(x)$, $\sec(x)$, and $\csc(x)$; and their inverse functions. 3. Students learn and use the concept of radian measure and conversion between degree and radian measures.</p> | <ul style="list-style-type: none"> • Write computer programs using a high level programming language (C Language) • Write computer programs using functions • Create proper test cases to test computer programs |
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Subject Prerequisite -- MATH 4C TRIGONOMETRY/PRECALCULUS

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ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

1. The prerequisite/corequisite is required by law or government regulations.
Explain or cite regulation numbers:
2. The health or safety of the students in this course requires the prerequisite.
Justification: Indicate how this is so.
3. The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
Justification: Indicate how this is so.
4. The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.
Justification: Indicate how this is so.
5. Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance
in the target course.
Justification: Cite the statistical evidence from the research.
6. The prerequisite course is part of a sequence of courses within or across a discipline.
7. Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

CSU Fresno, CSCI 40, Pass ELM and Trigonometry;
UC Davis, ECS 30, MATH 16A or MATH21A (Calculus) previously or concurrently;
CSULB, CECS 174, MATH 117.