

# CS M125: PROGRAMMING CONCEPTS AND METHODOLOGY I

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**Originator**

Loay Alnaji

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**College**

Moorpark College

**Attach Support Documentation (as needed)**

CS M125\_state approval letter\_formerly CS M10A.pdf

**Discipline (CB01A)**

CS - Computer Science

**Course Number (CB01B)**

M125

**Course Title (CB02)**

Programming Concepts and Methodology I

**Banner/Short Title**

Prog Concepts Methodology I

**Credit Type**

Credit

**Start Term**

Spring 2020

**Formerly**

CS M10A.

**Catalog Course Description**

Provides an introduction to the C++ programming language. Covers the basic components, syntax, and semantics of the C++ programming language. Introduces basic programming concepts such as algorithms, data and control structures, documentation, structured programming, arrays, and pointers.

**Additional Catalog Notes**

UC - CIS M140, CS M01, CS M10A, M125 combined: maximum credit, 4 units.

**Taxonomy of Programs (TOP) Code (CB03)**

0706.00 - Computer Science (transfer)

**Course Credit Status (CB04)**

D (Credit - Degree Applicable)

**Course Transfer Status (CB05) (select one only)**

A (Transferable to both UC and CSU)

**Course Basic Skills Status (CB08)**

N - The Course is Not a Basic Skills Course

**SAM Priority Code (CB09)**

E - Non-Occupational

**Course Cooperative Work Experience Education Status (CB10)**

N - Is Not Part of a Cooperative Work Experience Education Program

**Course Classification Status (CB11)**

Y - Credit Course

**Educational Assistance Class Instruction (Approved Special Class) (CB13)**

N - The Course is Not an Approved Special Class

**Course Prior to Transfer Level (CB21)**

Y - Not Applicable

**Course Noncredit Category (CB22)**

Y - Credit Course

**Funding Agency Category (CB23)**

Y - Not Applicable (Funding Not Used)

**Course Program Status (CB24)**

1 - Program Applicable

**General Education Status (CB25)**

Y - Not Applicable

**Support Course Status (CB26)**

N - Course is not a support course

**Field trips**

Will not be required

**Grading method**

Letter Graded

**Alternate grading methods**

Student Option- Letter/Pass

Pass/No Pass Grading

**Does this course require an instructional materials fee?**

No

**Repeatable for Credit**

No

**Is this course part of a family?**

No

**Units and Hours**

**Carnegie Unit Override**

No

**In-Class**

**Lecture**

**Minimum Contact/In-Class Lecture Hours**

52.5

**Maximum Contact/In-Class Lecture Hours**

52.5

**Activity****Laboratory****Total in-Class**

Total in-Class

**Outside-of-Class**

Internship/Cooperative Work Experience

Paid

Unpaid

**Total Outside-of-Class**

Total Outside-of-Class

Minimum Outside-of-Class Hours

105

Maximum Outside-of-Class Hours

105

**Total Student Learning**

Total Student Learning

Minimum Units (CB07)

3

Maximum Units (CB06)

3

**Advisories on Recommended Preparation**

CS M01 and MATH M06 or MATH M07

**Student Learning Outcomes (CSLOs)**

Upon satisfactory completion of the course, students will be able to:	
1	understand basic programming concepts such as algorithms and data
2	write a program which combines C++ arrays, structures and pointers.

**Course Objectives**

Upon satisfactory completion of the course, students will be able to:	
1	describe the basic organization of a computer system.
2	describe the basic components, syntax, and semantics of the C++ programming language.
3	analyze programming problems and design algorithms to solve those problems.
4	identify sequential, selection, and iteration control structures.
5	apply the concepts of structured programming including function usage and parameter passing.
6	apply composite data types such as arrays and structures.
7	demonstrate and understanding of user defined data types such as enumerations and structured data.
8	describe and apply dynamic memory allocation using pointers.
9	identify file input and output.
10	identify good programming practice and style.

**Course Content****Lecture/Course Content****12% - Introduction to C++**

- What the basic components of a C++ program are

- Using the Integrated Programming Environment
- Preprocessor introduction
- Header files

**19% - Lexical Elements, Operators, and the C++ System**

- Data types
- Identifiers
- Variables
- Constants
- Operators
- Operator precedence and associativity

**18% - Flow of Control**

- Relational and boolean operators
- If and switch statements
- While, for, and do/while loops

**12% - Functions and Structured Programming**

- What functions are
- Writing C++ functions
- Using C++ functions
- Parameter passing (call by value and call by reference)
- Separate compilation
- Structured programming and top-down design
- Scope concepts

**3% - Standard Data Types and Enumerated Types**

- Input and output of different data types
- Promotion and type casting
- Enumerated types and user defined data types

**12% - Pointers**

- Indirect addressing
- Dereferencing
- Memory usage
- Parameter passing by address
- Static local variables
- Storage classes
- Type qualifiers
- Dynamic storage allocation
- Relationship between arrays and pointers
- Dynamically allocating arrays

**10% - Arrays**

- One dimensional arrays
- Two dimensional arrays
- Multidimensional arrays
- Introduction to vectors
- Sorting and searching arrays

**9% - Structures**

- Declaring structures
- Accessing members
- Self-referential structures

**5% - File Input and Output**

- Accessing files
- Reading from a file
- Writing to a file

**Laboratory or Activity Content**

Not applicable.

**Methods of Evaluation**

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises  
Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Classroom Discussion  
Objective exams

Projects  
 Problem-solving exams  
 Participation  
 Skills demonstrations

## Instructional Methodology

### Specify the methods of instruction that may be employed in this course

Distance Education  
 Laboratory activities  
 Lecture  
 Other (specify)

### Specify other method of instruction

Introduction of programming concepts with detailed coding examples.  
 Practice problems to develop proper programming skills and techniques.  
 Student/instructor interaction using questions and answers.  
 Projects and/or group work to enhance student understanding of the concepts.

### Describe specific examples of the methods the instructor will use:

The instructor will assign written homework exercises and programming assignments requiring students to analyze a problem, determine a solution, implement the solution using a programming language, and test and verify the program.

There may be weekly quizzes (or some other time frame as determined by the instructor) where students will test their knowledge of the material. The instructor may assign exercises through which students explore course concepts using the textbook and additional research. There may also be projects which require students to write programs.

## Representative Course Assignments

### Writing Assignments

1. Write comments on and critiques of computer programs.
2. Write a paper that describes the basic components, syntax, and semantics of the C++ programming language.

### Critical Thinking Assignments

1. Evaluate incorrect programs and/or program fragments to determine what errors occur and correct the syntax and/or semantics of the problems identified.
2. Design and evaluate algorithms to solve problems

### Reading Assignments

1. Analyze programming problems in C++ and design algorithms to solve the problems.
2. Read professional publications in addition to the text assignments.

## Outside Assignments

### Representative Outside Assignments

1. Develop algorithms for programming assignments.
2. Research and apply composite data types that are used in C++ language, such as arrays and structures.

## Articulation

### C-ID Descriptor Number

COMP 122

### Status

Approved

### Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
Cal Poly Pomona	CS 1280	Introduction to C++	3
UC San Diego	MAE 9	C/C++ Programming	4

Cal Poly San Luis Obispo	CPE/CSC 101	Fundamentals of Computer Science I	4
UC Davis	ENG CS 30	Prog/Prob Solving: C	4

## District General Education

### A. Natural Sciences

### B. Social and Behavioral Sciences

### C. Humanities

### D. Language and Rationality

#### D2. Communication/Analytical Thinking

Proposed

### E. Health and Physical Education/Kinesiology

### F. Ethnic Studies/Gender Studies

## CSU GE-Breadth

### Area A: English Language Communication and Critical Thinking

### Area B: Scientific Inquiry and Quantitative Reasoning

### Area C: Arts and Humanities

### Area D: Social Sciences

### Area E: Lifelong Learning and Self-Development

## CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

## IGETC

### Area 1: English Communication

### Area 2A: Mathematical Concepts & Quantitative Reasoning

### Area 3: Arts and Humanities

### Area 4: Social and Behavioral Sciences

### Area 5: Physical and Biological Sciences

### Area 6: Languages Other than English (LOTE)

## Textbooks and Lab Manuals

### Resource Type

Textbook

### Description

Deitel, Paul, and Harvey Deitel (2016). *C++ How to Program*(10th). Pearson. 9780134448237

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### Resource Type

Textbook

### Description

Gaddis Tony (2017). *Starting Out With C++: From Control Structures Through Objects*(9th). Pearson. 9780134498379

**Resource Type**

Software

**Description**

Microsoft Visual Studio 2015 Express C++. Microsoft.

**Library Resources****Assignments requiring library resources**

Using the Library's online databases, research an engineering design project which uses computer programming for simulation.

**Sufficient Library Resources exist**

Yes

**Distance Education Addendum****Definitions****Distance Education Modalities**

Hybrid (51–99% online)

100% Online

**Faculty Certifications**

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

**Regular Effective/Substantive Contact****Hybrid (51%–99% online) Modality:**

Method of Instruction	Document typical activities or assignments for each method of instruction
E-mail	Instructor will email students with announcements about the course or an upcoming event.
Synchronous Dialog (e.g., online chat)	Instructor may be available on certain day(s) for a certain time frame to help students.
Other DE (e.g., recorded lectures)	Instructor may record the lectures and post them for students to view within a specified time frame to be ready for the accompanying assignment.

**100% online Modality:**

Method of Instruction	Document typical activities or assignments for each method of instruction
E-mail	Instructor will email students with announcements about the course or an upcoming event.
Synchronous Dialog (e.g., online chat)	The instructor may be available on certain day(s) for a certain time frame to help students.

Other DE (e.g., recorded lectures)

Instructor may record the lectures and post them for students to view within a specified time frame to be ready for the accompanying assignment.

Asynchronous Dialog (e.g., discussion board)

Instructor will post a question, students will respond to the question.

## Examinations

### Hybrid (51%–99% online) Modality

Online

On campus

### Primary Minimum Qualification

COMPUTER SCIENCE

## Review and Approval Dates

### Department Chair

01/10/19

### Dean

01/10/19

### Technical Review

01/31/19

### Curriculum Committee

02/08/19

### DTRW-I

09/12/2019

### Curriculum Committee

MM/DD/YYYY

### Board

10/08/2019

### CCCCO

10/12/2019

### Control Number

CCC000608534

### DOE/accreditation approval date

MM/DD/YYYY