

Common Course Outline

Course Prefix and Number: CSCI 1107

- A. Course Title Fundamentals of Computer Science 2
- B. Semester Credit Value 4 credits
- C. Prerequisites CSCI 1106 and Math 1200
- D. Catalog Description
Continuation of CSCI 1106. Object oriented problem solving and programming techniques, and basic algorithmic analysis techniques are introduced. Elementary data structures such as lists, stacks, queues, trees and graphs are introduced. Software engineering principles are explored using an object-oriented language.
- E. General Course Purpose
- 1) To provide the student an introduction to the fundamentals of software design, abstract data structures and algorithmic design.
 - 2) To provide the second course in a two semester sequence for transfer to a four year institution.
- F. Course Information
1. Hours per Week
 - a. Classroom 3 hrs
 - b. Laboratory 1 hr
 - c. Clinical
 - d. Other (describe)
 2. Degree for which Course is Intended AAS in ENGR, Transfer in Computer/Information Sciences
 3. Program of Study for which Course is Required
Depends upon specific engineering area and transfer program (i.e. May be required for some students and not for others – dependent upon the area of further study they will pursue.)
- G. Learner Outcomes
1. At the conclusion of the course the student should be able to:
 - a) Understand the principle of software design
 - b) Understand ethical and moral issues as related to computer science applications
 - c) Understand and write computer programs employing:
 - object oriented programming techniques
 - objects, structures, and classes
 - d) Understand Object Oriented Programming concepts
 - e) Data abstraction
 - f) Have a basic working knowledge of elementary data structures with a specific understanding of:
 - stacks
 - queues
 - lists
 - trees
 - searching

- sorting
 - hashing
 - tables
 - graphs and networks
- g) graphical user interfaces

H. ARCC Guiding Principle(s) Satisfied

Identify the learner outcomes (from G) which relate to each of the guiding principles listed below or describe how the guiding principle(s) is/are used in this course.

- | | |
|----------------------------|---|
| 1. Clear Thinking | 1 |
| 2. Effective Communication | 1 |
| 3. Accepting Diversity | 1 |

Students are encouraged to employ unique solution techniques to assigned problems. Problems “that do not have a correct solution” are assigned. This allows the student to express individuality.

4. Ethical Decision-Making

Ethical and moral issues will be addressed as a portion of the course content. Specific discussion of copyright laws, data integrity, and unauthorized access to files by computer programmers (“hackers”) will be discussed.

I. Minnesota Transfer Curriculum Emphasis Area(s) Satisfied: None

J. Entry Level Skills/Knowledge

Choose: 1 (basic), 2 (pre-college), or 3 (college)

- | | |
|-----------------|---|
| 1. Mathematics: | 3 |
| 2. Reading: | 3 |
| 3. Writing: | 3 |

K. Major Areas of Course Content:

Software engineering, object oriented programming (encapsulation, polymorphism, and inheritance), Abstract Data Types, stacks, queues, lists, binary trees, sorting, tables, graphs and networks.

L. Outcomes Assessment:

1. Learner outcomes that will be assessed (from G): All areas outlined in G will be assessed.

2. How information will be collected to assess outcomes:

Students will be assessed in a variety of ways including, but not limited to: written homework assignments ; programming assignments with the laboratory portion of the course; programming assignments outside of lab, a semester programming project(either as a group or as an individual project), periodic hour exams, and a comprehensive final examination will be administered.

Transfer institutions will be contacted and input regarding the preparation of ARCC students at their institution will be sought.

3. When information will be collected (i.e., each semester, yearly):

Course:

- a. written exams
- b. programming assignments
- c. completion of final project
- d. final examination
- e. homework assignments
- f. class discussion
- g. laboratory reports

Transfer: Yearly contact will be maintained with the (primary) institutions to which ARCC students transfer. Verbal input and GPAs will contribute to the assessment.

4. Measure(s) used to determine if an outcome has been achieved:

Course: Grades and overall performance of the student
Transfer: GPAs and verbal input from transfer institution “contacts”

5. Person/Group responsible for information collection: Course: Course instructor
Transfer: Computer Science coordinator and all faculty teaching CS courses

6. Person/Group responsible for reviewing the resulting data:
Computer Science coordinator and all faculty teaching computer science courses

M. Procedure for Credit by Examination:

This will be a two step process:

- a) A comprehensive examination will be administered
- b) A programming project will be assigned that is commensurate with the level of expertise of an average student that has completed this course.

N. Proposed Implementation Date: Fall 2002