Institution: University of Oklahoma, Norman, OK Date: May 1996

COURSE DESCRIPTION

Department and Course Number: -CS1323- Course Coordinator: _Le Gruenwald

Course Title: Fundamentals of Computer Programming Total Credits: 3

Current Catalog Description Introduction to basic programming techniques: expressions, functions, conditionals, iteration, data abstraction. Practice in the use of high level languages. Emphasizes principles of software engineering and illustrates with examples from central areas of computing science.

Textbook: 1. Fortran 90 Programming by T. Ellis, Addison-Wesley, 1994.
2. On to C by P. Winston, Addison-Wesley, 1994. Prentice-Hall, 1995.

References: None

Course Goals: To provide students with the ability to program computers and use them as problem solving tools. Emphasis is on principles of software engineering and applications from central areas of computer science.

Prerequisites by Topic High school mathematics.

Major Topics Covered in the Course Introduction to computers and programming; essential data handling: data types (integer, real, character), declarations, assignment, input, output, constants, abstract data types; topdown design with simple functions; selection: if, case; iterations; modular programming: subroutines, functions, modules; one-dimensional arrays, two-dimensional arrays, searching, sorting; formatted input and output. File processing.

Laboratory projects (specify number of weeks on each)
A total of eight projects. Four projects: one week each. Four projects: two weeks each.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	_x_	____	Computer Organization and Architecture	_X_	____
Algorithms	_x_	____	Concept of Programming Languages	_x_	_x_
Software Design	_x_	____			

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically 0 pages and to make 0 oral presentations of typically 0 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

One hour on what plagiarism in programming means and what the penalty will be for this course.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Analysis and Design

Please describe the analysis and design experiences common to all course sections.

Students learn to analyze the requirements of problems, set-up input/output parameters, other parameters and data structures. Design pseudo-code algorithms to solve the problems, translate the algorithms to computer programs, execute and test the programs with different sets of input.

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 0%

Program Objectives: 2.i, 2.iii

ABET 2000 Criterion 3 Contents: a

Institution: University of Oklahoma, Norman, OK Date: May 1996

COURSE DESCRIPTION

Department and Course Number: CS1333 Course Coordinator: Sudarshan K. Dhall

Course Title: Programming Structures and Abstraction Total Credits: 3

Current Catalog Description Organizing data to facilitate programming and computation. Use of pointers and dynamic memory allocation to represent stacks, queues, linked lists, trees. File processing. Continued practice in the use of high level programming languages and the application of software engineering principles with examples from central areas of computing science.

Textbook 1. A Book on C by Al Kelly & Ira Pohl, Benjamin Cummings Publishing Co., Inc., CA.
2. File Structures, by M.J. Folk and B. Zoellick, Addison Wesley Publishing Co., Inc., MA.

References: None.

Course Goals: To provide further experience in structured programming and the use of basic data structures like stacks, queues, trees, etc., and to provide basic knowledge about file organization on disks.

Prerequisites by Topic First course in programming, and working knowledge of C, not necessarily including use of pointers.

Major Topics Covered in the Course

Pointers in C. Dynamic memory allocation. Basic data structures: linked lists, stack, queues, double-ended queues, trees; sorting algorithms, linear search vs. binary search, hashing. Recursion. File organization on disks.

Laboratory projects (specify number of weeks on each)

0. Linear search vs. binary search - one week (to refresh knowledge of C.)
I . String manipulation in C - two weeks.
2. KWIC Index using linked lists two weeks.
30 KWIC Index using binary tree two weeks.
4. Simulation using queues -- 10 days.
5. File handling and bit manipulation - one week.
6. More on file handling -- one week.
7. Hashing -- two weeks.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	X	____	Computer Organization and Architecture	____	____
Algorithms	X	____	Concept of Programming Languages	____	____
Software Design	X	____			

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically _x_ pages and to make 0 oral presentations of typically _x_ minutes duration. Include only material that is graded For grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

None.

Analysis and Design

Please describe the analysis and design experiences common to all course sections.

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 0%

Program Objectives: 2.i,

ABET 2000 Criterion 3 Contents: a

Institution: University of Oklahoma, Norman, OK Date: May 1996

COURSE DESCRIPTION

Department and Course Number: CS1813 Course Coordinator: -K. Thulasiraman

Course Title: Discrete Mathematics Total Credits: 3

Current Catalog Description: Introduction to the mathematical foundation of computer science. Topics include combinatorics, logic, relations, functions, computational complexity, automata, and graph theory.

Textbook: Foundations of Discrete Mathematics, A.D. Polimeni and H. Joseph Straight. Brooks/Cole Publishing Co.

References: None

Course Goals: To introduce the topics in discrete mathematics and basic study of computer science.ving tools.

Prerequisites by Topic High school mathematics and introductory programming.

Major Topics Covered in the Course Logic; set theory; mathematical induction; relations; functions; graph theory; and combinatorial mathematics.

Laboratory projects (specify number of weeks on each) None.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	____	____	Computer Organization and Architecture	____	____
Algorithms	____	____	Concept of Programming Languages	____	X
Software Design	____	____			

Oral and Written Communications

Every student is required to submit at least _O_ written reports (not including exams, tests, quizzes, or commented programs) of typically _O_ pages and to make _ 0 _ oral presentations of typically _O_ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)? None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage. The entire course is of theoretical nature. It covers all fundamental concepts in discrete mathematics and emphasizes proof techniques.

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 0%

Program Objectives: 1.i

ABET 2000 Criterion 3 Contents: a

Institution: University of Oklahoma, Norman, OK Date: May 1996

COURSE DESCRIPTION

Department and Course Number: -CS2413- Course Coordinator: -Deborah A. Trytten

Course Title: Data Structures- Total Credits: 3

Current Catalog Description: Object oriented representation of widely used data structures and associated algorithms.

Textbook: 1. Introduction to Data Structures and Algorithm Analysis with C + +, Pothering and Naps, West Publishing, 1995.

2. Mastering C + +: An Introduction to C + + and Object-Oriented Programming for C and Pascal Programmers. Horstmann John Wiley, 1996.

3. C + + Programmers Guide to the Standard Template Library, Nelson, IDG Books Worldwide, 1995.

References: None

Course Goals: Learn a Variety of classic methods for organizing and manipulating data in a computer program. Learn to use formal methods for analyzing and evaluating a variety of data structures and algorithms. Gain experience in coding larger and more sophisticated projects in an object oriented programming language.

Prerequisites by Topic Discrete Mathematics (Logic, sets, combinatorics, proofs); Computer Programming (variables, constants, conditional statements, loops, static and dynamic allocation, pointers, file organization, 1/0, etc.); arrays (1 and 2D), stacks queues, binary search trees.

Major Topics Covered in the Course Measuring the efficiency of algorithms, data abstraction, inheritance, lists, recursion, binary trees (including binary search tree briefly), height balanced trees, graphs and networks, hashing, C + + Standard Template Library.

Laboratory projects (specify number of weeks on each)

Perform a simple image processing operation using a two dimensional array. Not done with object oriented programming (10 days).
Create a (32,5) Reed-Muller error correcting code using two classes (array, and String) which have already been implemented (2 weeks).
Create a library for a linked two dimensional matrix with overloaded operators (2 weeks).
Do a Monte Carlo simulation of CPU scheduling using the Standard Template Library (2 weeks).
Implement the Huffman compression algorithm using a binary tree (2 weeks).
Parse a bibliography database file and store the information for retrieval in an associate map. (2 weeks)
Uses a finite state automata.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	_X_		Computer Organization and Architecture	____	____
Algorithms	_X_		Concept of Programming Languages	____	____
Software Design	_X_				

Oral and Written Communications

Every student is required to submit at least - 0 - written reports (not including exams, tests, quizzes, or commented programs) of typically __O_ pages and to make - 0- oral presentations of typically _0_ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

Responsibilities of programmers to society (I class). Discussions of important recent software failures and the consequences of these failures (2 classes). Professional licensing for software engineers (1/3 class).

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

0() notation. (2 weeks). Inductive thinking leading to mathematical induction (I week). Proving program correctness (I week).

Analysis and Design

Please describe the analysis and design experiences common to all course sections.

Students designed and implemented all six programming projects. Object oriented design was discussed extensively, with a focus on how abstract data types improve software engineering practice.

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 3 hours Engineering Science

Program Objectives: 2.i

ABET 2000 Criterion 3 Contents: a, f

COURSE DESCRIPTION

Department and Course Number: CS3113 Course Coordinator: S. Radhakrishnan

Course Title: Operating System Total Credits: 3

Current Catalog Description: Introduction to the major concept areas and techniques of designing and implementing operating systems.

Textbook: Operating Systems Concepts, Fourth Edition, by Silberschatz and Galvin. Addison-Wesley.

References: None

Course Goals: To understand principles in the design of an operating system.

Prequisites by Topic Data structures and computer organization.

Major Topics Covered in the Course OS structures; process synchronization and management; deadlocks; memory management; file systems; auxiliary storage management; protection and security.

Laboratory projects (specify number of weeks on each)
Five projects; about 2.5 weeks per project.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	-X	____	Computer Organization and Architecture	-X	____
Algorithms	-X-	____	Concept of Programming Languages	-X	____
Software Design		__X__			

Oral and Written Communications

Every student is required to submit at least __O__ written reports (not including exams, tests, quizzes, or commented programs) of typically 0__ pages and to make __ 0 __ oral presentations of typically _O__ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

Protection and security of computer systems is discussed (1.5 weeks). Exam contained a question on protection and security.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Algorithms and complexity, particularly on topics dealing with deadlock, CPU scheduling, and page replacement.

Analysis and Design

Please describe the analysis and design experiences common to all course sections.

The assigned programs require significant analysis of the problem. Later programs are built on previous assignments, and hence modularity for reuse and maintenance is stressed.

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 3 hours Engineering Science

Program Objectives: 2.i, 2.iii

ABET 2000 Criterion 3 Contents: a

Institution: University of Oklahoma, Norman, OK Date: May 1996

COURSE DESCRIPTION

Department and Course Number: CS4263 Course Coordinator: R. L. Page

Course Title: Software Engineering I Total Credits: 3

Current Catalog Description: Methods and tools for software specification, design, and documentation. Emphasis on architectural modularity and encapsulation of software objects. Students working in teams apply these ideas to design and document a significant software product.

Textbook: A Discipline for Software Engineering, Humphery. Addison Wesley, 1995.

References: None

Course Goals: Students learn and practice a disciplined software process, including recording and analyzing statistics on defect ratio and production ratio; teamwork is also practiced on several assignments.

Prerequisites by Topic Operating systems; compilers.

Major Topics Covered in the Course Software process; design methods; effective defect removal; size estimation, project planning; design and code reviews.

Laboratory projects (specify number of weeks on each)

Ten software development exercises - one week each; Three team reports analyzing development statistics.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	___	____	Computer Organization and Architecture	___	____
Algorithms	___	____	Concept of Programming Languages	___	____
Software Design	X				

Oral and Written Communications

Every student is required to submit at least __ 10 __ written reports (not including exams, tests, quizzes, or commented programs) of typically _5-15_ pages and to make __0__ oral presentations of typically __0__ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)? None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Software process - 8 hrs; planning - 4 hrs; estimation - 10 hrs; design & code rules - 2 hrs; design - 8 hrs; verification and quality measurement - 4 hrs.

Analysis and Design

Please describe the analysis and design experiences common to all course sections.

Design of 10 moderate size applications (100 - 500 lines of code); analysis of statistics measuring software process parameters (3 team projects).

Assessment Methods Used: Standard course evaluation

Contribution to Professional Component: 2.5 hours Engineering Science
0.5 hours Engineering Design

Program Objectives: 2.i, 2.iii

ABET 2000 Criterion 3 Contents: a, c, e