Computer Science

MAJOR

MINOR

CONCENTRATION IN NETWORKS

SEE RELATED PROGRAMS:

- COMPUTER INFORMATION SYSTEMS
- INFORMATION TECHNOLOGY
- SECURE COMPUTING & INFORMATION ASSURANCE

Professors: Chitsaz, Rinard (Chair)

Associate Professors: M. Flinn, Zheng

Assistant Professors: Pan, Xiao, Xu

Lecturers: Gbenro, S. Kennedy

- Computer science courses must have a grade of C or better to be applied towards major or minor requirements.
- You will be de-registered from any computer science course for which you have not earned a C or better in the prerequisite computer science course(s).
- You may receive credit by examination for the following courses: COSC 100, 101, 240, 350.
- The Department of Computer Science & Information Technologies also offers four certificates to students in other majors and community members. (See separate section).

Mission Statement

The Computer Science & Information Technologies Department's mission is to present our students with up-to-date curricula and pedagogy in the computer science and information systems disciplines, ensure that they have a solid foundation in the core concepts, equip them with problem solving and decision-making skills, and prepare them for lifelong learning in the discipline. The department provides for and encourages collegial, intellectual, and academic growth of its faculty. The department supports and encourages local and regional technology initiatives contributing to educational and economic advances.

Program Educational Objectives

The Frostburg Computer Science program will graduate computer science professionals who have:

- A solid foundation in core computer science concepts reinforced with mathematics and natural science
- An ability to apply modern computer science concepts and theories to contemporary, real world problems
- An understanding of professional responsibility to evaluate their ethical obligations to society, employers, employees and their peers
- An understanding of the commitment needed to pursue life long goals through educational and professional endeavors

Program Outcomes

The Frostburg Computer Science program will provide students with:

- An ability to apply knowledge of computing and mathematics appropriate to the discipline;
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
- An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
- An ability to function effectively on teams to accomplish a common goal;
- An understanding of professional, ethical, legal, security, and social issues and responsibilities;
- An ability to communicate effectively with a range of audiences;

- An ability to analyze the local and global impact of computing on individuals, organizations and society;
- A recognition of the need for, and an ability to engage in, continuing professional development;
- An ability to use current techniques, skills, and tools necessary for computing practices;
- An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
- An ability to apply design and development principles in the construction of software systems of varying complexity.

Program Requirements

	MAJOR	NETWORKS CONC.	MINOR
Hours Required in Computer Science:	50	50	20
Hours Required in Other Departments:	32	32	0
Total Hours Required:	82	82	20

Requirements for Major in Computer Science

1. Core Courses: *(26 hours)*

COSC	101	The Discipline of Computer Science *(Tech. Fluency)*
COSC	102	Foundations of Computer Science
COSC	240	Computer Science I
COSC	241	Computer Science II
COSC	325	Software Engineering
COSC	365	Digital Logic
COSC	460	Operating Systems Concepts
COSC	489	Computer Science Capstone

2. Required Advanced Courses: *(18 hours)*

COSC	310	Data Structures & Algorithm Analysis
COSC	331	Fundamentals of Computer Networks
COSC	350	Low-Level Programming Concepts
COSC	444	Introduction to Parallel Computing
COSC	450	Programming Language Principles & Paradigms
COSC	485	Introduction to the Theory of Computation

3. Other Required Courses:

Mathematics *(14 hours)*

MATH 236 Calculus I *(Core Skill 3)*
MATH 237 Calculus II
MATH 350 Linear Algebra I
   or MATH 432 Differential Equations
   or MATH 435 Numerical Analysis
   or MATH 437 Combinatorics and Graph Theory
   or MATH 470 Mathematical Models and Applications
MATH 380 Introduction to Probability & Statistics

Science *(12 hours)*:

Select two courses from the following:
BIOL 149 General Biology I
CHEM 201 General Chemistry I
GEOG 103 Physical Geography
PHYS 261 Principles of Physics I: Mechanics
AND select one course from the following:
BIOL 160 General Zoology
BIOL 161 General Botany
CHEM 202 General Chemistry II
PHYS 262 Principles of Physics II: Electricity and Magnetism

Other *(6 hours)*
CMST 102 Introduction to Human Communication
ENGL 338 Technical Writing *(Core Skill 2)*

4. Electives: *(6 hours)*

A minimum of 6 hours in at least two courses
COSC 305 Computer Ethics
COSC 335 Advanced Topics in Computer Networks
COSC 345 The Internet and Multimedia Communications
COSC 390 Topics in Modern Programming Languages
COSC 415 Computer Interfacing
COSC 420 Robotics and Industrial Computer Applications
COSC 431 Secure Computing
COSC 435 Network Implementation and Testing
COSC 440 Database Management Systems
COSC 445 Network Programming
COSC 455 Artificial Intelligence
COSC 465 Computer Systems Architecture
COSC 470 Compiler Design and Implementation
COSC 475 Interactive Computer Graphics
COSC 491 Seminar in Computer Science
COSC 494 Field Exp. in Computer/Information Science
COSC 499 Individual Problems in Computer Science
ITEC 442 Electronic Commerce

Requirements for Major Concentrating in Networks

1. Core Courses: *(26 hours)*

COSC 101 The Discipline of Computer Science *(Tech. Fluency)*
COSC 102 Foundations of Computer Science
COSC 240 Computer Science I
COSC 241 Computer Science II
COSC 325 Software Engineering

COSC 365 Digital Logic
COSC 460 Operating Systems Concepts
COSC 489 Computer Science Capstone

2. Required Advanced Courses: *(15 hours)*

COSC 331 Fundamentals of Computer Networks
COSC 335 Advanced Topics in Computer Networks
COSC 345 The Internet and Multimedia Communications
COSC 431 Secure Computing
COSC 435 Network Implementation and Testing

3. Other Required Courses:

Mathematics: *(14 hours)*

MATH 236 Calculus I *(Core Skill 3)*
MATH 237 Calculus II
MATH 350 Linear Algebra I
   or MATH 432 Differential Equations
   or MATH 435 Numerical Analysis
   or MATH 437 Combinatorics and Graph Theory
   or MATH 470 Mathematical Models and Applications
MATH 380 Introduction to Probability and Statistics
   or MATH 109/110 Elements of Applied Probability & Statistics
       (Core Skill 3)

Science: *(12 hours):*

Select two courses from the following:
BIOL 149 General Biology I
CHEM 201 General Chemistry I
GEOG 103 Physical Geography
PHYS 261 Principles of Physics I: Mechanics
And select one course from the following:
BIOL 160 General Zoology
BIOL 161 General Botany
CHEM 202 General Chemistry II
PHYS 262 Principles of Physics II: Electricity and Magnetism

Other: *(6 hours)*

CMST 102 Introduction to Human Communication
ENGL 338 Technical Writing *(Core Skill 2)*

4. Electives: *(9 hours)*

A minimum of 9 hours in at least three courses:
COSC 305 Computer Ethics
COSC 310 Data Structures and Algorithm Analysis
COSC 350 Low-Level Programming Concepts
COSC 390 Topics in Modern Programming Languages
COSC 444 Introduction to Parallel Computing
COSC 445 Network Programming
COSC 450 Programming Language Principles & Paradigms
COSC 455 Artificial Intelligence
COSC 465 Computer Systems Architecture
COSC 475 Interactive Computer Graphics
COSC 485 Introduction to the Theory of Computation
COSC 491 Seminar in Computer Science
COSC 494 Field Exp. in Computer/Information Science
COSC 499 Individual Problems in Computer Science
ITEC 442 Electronic Commerce

Requirements for Minor in Computer Science

1. Core Courses: *(11 hours)*

COSC 101 The Discipline of Computer Science *(Tech. Fluency)*
COSC 240 Computer Science I
COSC 241 Computer Science II

2. Electives: *(9 hours)*

Three additional computer science courses.
Two must be at the 300-level or above.