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 lifelong 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

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<tr>
<th>MAJOR</th>
<th>NETWORKS CONC.</th>
<th>MINOR</th>
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<tbody>
<tr>
<td>Hours Required in Computer Science:</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Hours Required in Other Departments:</td>
<td>32</td>
<td>32</td>
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<tr>
<td>Total Hours Required:</td>
<td>82</td>
<td>82</td>
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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 250 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 261 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.