

# MAJOR IN COMPUTER SCIENCE - CYBER OPERATIONS TRACK

## Requirements

The Computer Science major with a track in Cyber Operations requires 87–88 units. A minimum of 30 major units must be taken at Towson University.

Code	Title	Units
<b>Required Computer Science Courses</b>		
CIS 377	INTRODUCTION TO CYBERSECURITY	3
COSC 236	INTRODUCTION TO COMPUTER SCIENCE I <sup>1</sup>	4
COSC 237	INTRODUCTION TO COMPUTER SCIENCE II	4
COSC 290	PRINCIPLES OF COMPUTER ORGANIZATION	4
COSC 336	DATA STRUCTURES AND ALGORITHM ANALYSIS	4
COSC 350	DATA COMMUNICATIONS AND NETWORKING	3
COSC 412	SOFTWARE ENGINEERING	3
COSC 439	OPERATING SYSTEMS	3
COSC 455	PROGRAMMING LANGUAGES: DESIGN & IMPLEMENTATION	3
COSC 457	DATABASE MANAGEMENT SYSTEMS	3
<b>Required Math Courses</b>		
MATH 263	DISCRETE MATHEMATICS	3-4
or MATH 267	INTRODUCTION TO ABSTRACT MATHEMATICS	
MATH 273	CALCULUS I	4
MATH 274	CALCULUS II	4
MATH 314	INTRODUCTION TO CRYPTOGRAPHY	3
MATH 330	INTRODUCTION TO STATISTICAL METHODS	4
<b>Required Cyber Operations Track Courses</b>		
COSC 340	SYSTEMS PROGRAMMING	3
COSC 440	OPERATING SYSTEMS SECURITY	3
COSC 450	NETWORK SECURITY	3
COSC 458	APPLICATION SOFTWARE SECURITY	3
COSC 481	CASE STUDIES IN COMPUTER SECURITY	3
COSC 485	REVERSE ENGINEERING AND MALWARE ANALYSIS	3
<b>Science Requirement</b>		
Select two lab science courses from the following (the courses do not need to form a sequence):		8
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	

CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY
GEOL 121	PHYSICAL GEOLOGY
PHYS 241	GENERAL PHYSICS I CALCULUS-BASED
PHYS 242	GENERAL PHYSICS II CALCULUS-BASED

### Other Requirements

Must be completed with a grade equivalent of 2.00 or higher.

COMM 131	PUBLIC SPEAKING (Core 5)	3
COSC 418	ETHICAL AND SOCIETAL CONCERNS OF COMPUTER SCIENTISTS (Core 14)	3
ENGL 317	WRITING FOR BUSINESS AND INDUSTRY (Core 9)	3
<b>Total Units</b>		<b>87-88</b>

<sup>1</sup> COSC 175 is a prerequisite for COSC 236.

## Four-Year Plan of Study

### Suggested Four-Year Plan

Based on course availability and student needs and preferences, the selected sequences will probably vary from those presented below. Students should consult with their adviser to make the most appropriate elective choices.

#### Freshman

Term 1	Units	Term 2	Units
COMM 131 (Core 5)	3	COSC 237	4
COSC 236 <sup>1</sup>	4	MATH 274	4
MATH 273 (Core 3)	4	Lab-Science (from approved list) (Core 7)	4
Core 1 (or Core 2)	3	Core 2 (or Core 1)	3
	<b>14</b>		<b>15</b>

#### Sophomore

Term 1	Units	Term 2	Units
COSC 336	4	CIS 377	3
MATH 263 or 267	3	COSC 290	4
Lab-Science (from approved list) (Core 8)	4	COSC 412	3
Core 4	3	MATH 330	4
Elective	3	Core 6	3
	<b>17</b>		<b>17</b>

#### Junior

Term 1	Units	Term 2	Units
COSC 340	3	COSC 439	3
COSC 350	3	COSC 455	3
ENGL 317 (Core 9)	3	COSC 457	3
MATH 314	3	Core 10	3
Elective	3	Core 13	3
	<b>15</b>		<b>15</b>

#### Senior

Term 1	Units	Term 2	Units
COSC 440	3	COSC 418 (Core 14)	3

COSC 450	3 COSC 481	3
COSC 458	3 COSC 485	3
Core 11	3 Elective	3
Core 12	3	
	<b>15</b>	<b>12</b>

**Total Units 120**

<sup>1</sup> COSC 175 and (MATH 119 or MATH 231 or a qualifying score in the Math placement test) is needed as a prerequisite to COSC 236.

## Learning Outcomes

- a. An ability to analyze a problem and to identify and define the computing requirements appropriate to its solution.
- b. An ability to design, implement and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline.
- c. An ability to communicate effectively with a range of audiences about technical information.
- d. An ability to make informed judgements in computing practice based on legal and ethical principles.
- e. An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk and produce deliverables.
- f. An ability to apply theory in the design and implementation of computer-based solutions.
- g. An ability to reason about and explain computer-based solutions at multiple levels of abstraction.
- h. An ability to apply security principles and practices to the environment, hardware, software, and human aspects of a system.
- i. An ability to analyze and evaluate systems with respect to maintaining operations in the presence of risks and threats.