To: Undergraduate Curriculum Committee
Thru: Dr. Mark Archambault, Associate Dean for Academics, College of Engineering and Science
Thru: Dr. Philip Bernhard, Head, Department of Computer Engineering and Sciences
From: Dr. T.J. O’Connor, Program Chair, Cybersecurity
Re: Adding a Concentration in Cyber Operations to the BS in Computer Science
Date: December 2, 2019

The Department of Computer Engineering and Sciences proposes the addition of a Cyber Operations Concentration to the existing Bachelor of Science program in Computer Science.

The proposed Cyber Operations Concentration builds upon the current ABET Accredited BS in Computer Science by adding a set of six courses that focus on Cyber Operations and provide hands-on experience with tools and techniques for investigating, analyzing and responding to cyber attacks. All six of these courses were previously approved by the Undergraduate Curriculum Committee.

Completion of this Concentration prepares graduates for careers in government and industry and will support the growing need for cyber operations professionals both locally and nationwide.

In addition, the Department intends to apply for accreditation as a National Center of Academic Excellence in Cyber Operations in the future and this Concentration is a required component of that program.

The proposed Concentration builds upon the first two years of the current BS in CS program and only requires changes in the third and fourth years. Because the additional courses for the Concentration are also computer science electives, they do not impact assessment of the Bachelor’s degree.

The following pages show the proposed plan for the BS in CS. The first page shows the first two years of the BS program, which is unchanged. The third and fourth years are then shown, both without and with the Concentration. The total number of credits is unchanged.
FLORIDA TECH

ADDING A NEW CONCENTRATION OR SPECIALIZATION TO AN EXISTING MAJOR

Please provide the following information when requesting a new concentration or specialization to be added to an existing program. New majors, minors and options (print on the diploma) are requested through the Adding a New Major/Minor to the Curriculum form. The name of the concentration/specialization does not print on diploma. New concentrations or specializations will be available beginning with the fall term in which they appear in the University Catalog.

COLLEGE: Engineering and Science
DEPARTMENT: Computer Engineering and Sciences

EXISTING PROGRAM NAME: Bachelor of Science in Computer Science
MAJOR CODE: 7 0 7 1

REQUEST TO ADD: □ Concentration □ Specialization

NAME FOR NEW CONCENTRATION OR SPECIALIZATION Does not print on diploma: Cyber Operations

ACADEMIC YEAR TO BE INITIATED: FALL 2020
ADVISOR FOR EXISTING PROGRAM: Dr. T. J. O’Connor

DESCRIPTION: Include all text for catalog, complete list of courses required for the concentration/specialization, and any requirements or restrictions.

Please see attached documentation.

APPROVALS: 1) Originator prepares and signs form. 2) Department head/major program chair or minor program chair approves and signs form. 3) Dean or Associate Dean reviews and signs form. 4) Graduate Council or Undergraduate Curriculum Committee approves academics and signs form and forwards to the Catalog & Curriculum Manager.

Originator: ___________________________ Date: 2-04-2019

Department Head / Major Program Chair: ___________________________ Date: 12-16-2019

Chair, Graduate Council: ___________________________ Date: 12-16-2019

Department Head / Minor Program Chair: ___________________________ Date: 12-16-2019

Chair, Undergraduate Curriculum Committee: ___________________________ Date: 12-16-2019

REGISTRAR’S USE ONLY

CAPP / Degree Evaluation:
☐ Yes ☐ No
Update completed: ___________________________ Date: ___________________________ Initials: ___________________________

Catalog Management System:
☐ Yes ☐ No
Update completed: ___________________________ Date: ___________________________ Initials: ___________________________

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RGR-434-818
Freshman Year

Fall (16 credit hours)

- COM 1101 Composition and Rhetoric
- CSE 1001 Fundamentals of Software Development 1
- CSE 1101 Computing Disciplines and Careers 1
- CSE 1400 Applied Discrete Mathematics
- FYE 1000 University Experience
- MTH 1001 Calculus 1 or MTH 1010 Honors Calculus 1

Spring (18 credit hours)

- COM 1102 Writing About Literature
- CSE 1002 Fundamentals of Software Development 2
- CSE 2120 Computer Organization and Machine Programming
- MTH 1002 Calculus 2 or MTH 1020 Honors Calculus 2
- Restricted Elective (laboratory science*) Credit Hours: 4

Sophomore Year

Fall (17 credit hours)

- COM 2223 Scientific and Technical Communication
- CSE 2010 Algorithms and Data Structures
- Restricted Elective (laboratory science*) Credit Hours: 4

Select first HUM Core Course:

- HUM 2051 Civilization 1: Ancient Through Medieval
- HUM 2053 Introduction to Asian Civilization
- HUM 2141 World Art History 1: Pre-History to Early Global Awareness
- HUM 2211 British Literature and Culture
- HUM 2212 British and American Literature 1
- HUM 2331 American History: Pre-Columbian to Civil War Era
- HUM 2551 Survey of Ancient and Medieval Philosophy

Select second HUM Core Course:

- HUM 2052 Civilization 2: Renaissance Through Modern
- HUM 2054 Introduction to Asian Civilization 2
- HUM 2142 World Art History 2: Early Modern to Post-Colonial
- HUM 2212 British and American Literature 1 (may not be repeated for credit)
- HUM 2213 British and American Literature 2
- HUM 2332 American History: From Reconstruction to the Present
- HUM 2552 Survey of Modern and Contemporary Philosophy

Spring (15 credit hours)

- CSE 2050 Programming in a Second Language
- CSE 2400 Applied Statistics or MTH 2401 Probability and Statistics
- CSE 2410 Introduction to Software Engineering
- MTH 3102 Introduction to Linear Algebra
- Humanities Elective (HU) 3000-level or higher recommended Credit Hours: 3
The third and fourth years of the existing Bachelor of Science in Computer Science are shown below:

Junior Year

Fall (15 credit hours)

- CSE 3120 Computer Architecture and Assembly Programming
- CSE 3231 Computer Networks
- CSE 4001 Operating Systems Concepts
- CSE 4020 Database Systems
- Restricted Elective (MTH or Science) Credit Hours: 3

Spring (16 credit hours)

- CSE 3100 Junior Project
- CSE 4232 Computer Network Programming
- CSE 4083 Formal Languages and Automata Theory
- CSE 4250 Programming Language Concepts
- Restricted Elective (MTH or Science) Credit Hours: 3
- Restricted Elective (Social Science) Credit Hours: 3

Senior Year

Fall (15 credit hours)

- CSE 4081 Introduction to Analysis of Algorithms
- CSE 4101 Computer Science Projects 1 (Q)
- Free Elective Credit Hours: 3
- CSE 4251 Compiler Theory
- Restricted Elective (CSE) Credit Hours: 3

Spring (15 credit hours)

- CSE 4102 Computer Science Projects 2 (Q)
- Technical Elective Credit Hours: 3
- CSE 4301 Introduction to Artificial Intelligence
- Restricted Electives (CSE) Credit Hours: 3
- Free Elective Credit Hours: 3

Total Credits Required: 127
This page shows the third and fourth years of the Bachelor of Science in Computer Science with the Concentration in Cyber Operations. Courses used for the Concentration are shown in **bold** type.

**Junior Year**

**Fall (15 credit hours)**

- CSE 3120 Computer Architecture and Assembly Programming
- CSE 3231 Computer Networks
- CSE 4001 Operating Systems Concepts
- **CSE 3801 Introduction to Cybersecurity**
- Restricted Elective (MTH or Science) Credit Hours: 3

**Spring (16 credit hours)**

- CSE 3100 Junior Project
- **CSE 3810 Cyber Defense**
- CSE 4083 Formal Languages and Automata Theory
- CSE 4250 Programming Language Concepts
- Restricted Elective (MTH or Science) Credit Hours: 3
- Restricted Elective (Social Science) Credit Hours: 3

**Senior Year**

**Fall (15 credit hours)**

- CSE 4081 Introduction to Analysis of Algorithms
- CSE 4101 Computer Science Projects 1 (Q)
- **CSE 4820 Wireless / Mobile Security**
- CSE 4830 Software Reverse Engineering
- Restricted Elective (CSE) Credit Hours: 3

**Spring (15 credit hours)**

- CSE 4102 Computer Science Projects 2 (Q)
- **CSE 4840 Cyber Offense**
- CSE 4850 Vulnerability Research
- Restricted Electives (CSE) Credit Hours: 3
- Free Elective Credit Hours: 3

**Total Credits Required: 127**