DO NOT TYPE IN THIS BOX

Bulletin #: 3

Academic Year: 2021 - 2022

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a Course Change

PART I. FILL OUT THIS SECTION COMPLETELY

1. **School/College** College of Engineering and Computing

Div./Dept. in Which Taught Knight Foundation School of Computing and Information Sciences

2.

Alpha Prefix	1st Digit	Last 3 Digits	"C"-lec-lab "L"-Lab	Cr. Hrs.
CIS	5	370	N/A	3

3. **Present Course Title** Principles of Cybersecurity

PART II. FILL OUT CHANGE INFORMATION ONLY

Change Effective 08 / 01 / 2022

4a. **New Course Title** Principles of Cybersecurity

b. **New Abbreviated course Title** *(for computer class schedules, transcripts)* Principles of Cybersec.

LIMITED TO 25 Characters *(including spaces)*

5a.

New Alpha Prefix	New 1st Digit	New Last 3 Digits	Change "C"-lec-lab "L"-Lab
CIS	5	370	N/A

5b. Change Credit Hours: From 3.00 **To** 3.00

6. **New Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*

College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

Introduction to principles of cybersecurity, e.g., separation, isolation, modularity, usability, and its foundations, e.g., security models, access control, security life-cycle and ethics

7. **New Prerequisite(s):** M.S. or Ph.D. standing or permission of the instructor

8. **New Corequisite(s):** None

9. **Explain Reclassification Request:**

This is part of a restructuring effort for the MS Cybersecurity program syllabus, to enable National Centers of Academic Excellence in Cybersecurity certification by the National Security Agency.

10. **Did you attach a copy of the course justification and course syllabus that contains the changes you are requesting?** NO ☐ YES ☑

11. **Does this proposed change impact the assessment process of a program or certificate? If yes, then send notification to assessment@fiu.edu.** NO ☐ YES ☐

PROPOSAL REQUESTED BY:

Faculty Contact Bogdan Carbunar (Type name) — Bogdan Carbunar Digitally signed by Bogdan Carbunar Date: 2021.11.08 15:16:39 -05'00' (Signature) — 11 / 08 / 2021

carbunar@cs.fiu.edu (Email address) — (305) 348-7566 (Phone number)

Chairperson (Dept./Div.) Jason Liu (Type name) — Jason Liu 2021.11.15 11:56:35 -05'00' (Signature) — 11 / 15 / 2021

Chairperson (Curr. Comm.) Elias Alwan (Type name) — (Signature) — / / 20

College/School Dean John Volakis (Type name) — (Signature) — / / 20

Submit one original form. Attach one copy of the course justification and a draft of the course syllabus reflecting any changes requested in this Proposal for a Course Change. The syllabus should include the course description, objectives, learning outcomes, major topics, and textbooks. Where applicable, please ensure that the changes you are requesting are included in the syllabus and supporting documentation.

FIU | Knight Foundation School of Computing and Information Sciences

MEMORANDUM

To: Mary Cossio
Faculty Senate

From: Faculty Contact and KFSCIS Chair

Subject: **Memo in Lieu of Faculty Contact and School's Director Signatures for Bulletin #3**

Date: November 18, 2021

As instructed by the Faculty Senate, this memo will serve as approval of the attached proposals for Bulletin #3 by our Faculty Contact (Bogdan Carbunar) and KFSCIS Director (Jason Liu) in lieu of physical signatures. The proposals in this Bulletin were approved by our Curriculum Committee on (11/17/2021).

FIU | Knight Foundation School of Computing and Information Sciences

MEMORANDUM

To: Mary Cossio
Faculty Senate

From: Dean or Assoc. Dean and College Curriculum Committee Chair

Subject: **Memo in Lieu of Curriculum Chair and Dean Signatures for Bulletin #3**

Date: November 18, 2021

As instructed by the Faculty Senate, this memo will serve as approval of the attached proposals for Bulletin #3 by our Curriculum Committee Chair (Elias Alwan), and the Dean for College of Engineering and Computing (John L. Volakis), in lieu of physical signatures. The proposals in this Bulletin were approved by our Curriculum Committee on (11/17/2021).

In addition to the above, memos in lieu of signatures have also been included by departments unable to obtain physical signatures for their faculty contact and/or department chair.

Principles of Cybersecurity
Course Justification

Attackers increasingly target a broad spectrum of computing systems, while regular Internet users who access many remote, online services, become increasingly vulnerable to a variety of privacy vulnerabilities. Graduate students will benefit from understanding basic principles and foundations of cybersecurity

The Knight Foundation School of Computing and Information currently offers the Masters of Science in Cybersecurity program, with a suite of computer and network security courses. We need however to restructure the program to allow its later certification by the National Security Agency (NSA), to receive the National Centers of Academic Excellence (CAE) in Cybersecurity designation.

We are proposing the following restructuring of the course syllabus:

- Move previously covered topics of mathematical foundations, symmetric and public key cryptography, key infrastructure, and certificates, to the newly proposed CIS-5XXX (CIS-5371) course.
- Cover new topics that include NSA-required (1) cybersecurity and secure design principles, (2) risk assessment, (3) security life-cycle, (4) trust management issues, (5) security models, (6) access control, and (7) legal issues and ethics.

Knight Foundation School of Computing and Information Sciences

Course Title: Principles of Cybersecurity **Date:** 11/08/2021

Course Number: CIS-5370

Number of Credits: 3

Subject Area: Cybersecurity	**Subject Area Coordinator:** **email:**
Catalog Description: Introduction to principles of cybersecurity, e.g., separation, isolation, modularity, usability, and its foundations, e.g., security models, access control, security life-cycle and ethics	
Textbook: Pfleeger, Charles P., and Shari Lawrence Pfleeger. *Analyzing computer security: A threat/vulnerability/countermeasure approach*. Prentice Hall Professional, 2012. And Bishop, Matt. *Computer Security: Art and Science*. Boston, MA: Addison-Wesley, 2003.	
References: None	
Prerequisites Courses: None **(**M.S. or Ph.D. standing or permission of the instructor)	
Corequisites Courses: None	

Type: Required

Prerequisites Topics:

- Pre-college Mathematics

Course Outcomes: At the end of the course, students should be able to:

O1. Explain the principles of security including domain and duty separation, isolation, encapsulation, modularity, least privilege, trust surface minimization

O2. Understand secure design principles including simplicity (mechanism economy), implementation minimization (least common mechanism), open design, complete mediation, layering, least astonishment, usability, fail safe defaults

O3. Describe software security principles

O4. Describe common vulnerabilities and risk management

O5. List and explain basic risk assessment steps, including asset identification, risk identification, impact analysis, risk prioritization, control evaluation, and application of appropriate controls.

O6. Master the concepts of security life-cycle.

O7. Describe data security concepts (in transmission, at rest, in processing) and also confidentiality, integrity, availability, authentication, authorization, non-repudiation and privacy.

O8. Describe security mechanisms, including identification, authentication and audit.

O9. Master security model concepts including Bell-La Padula, Biba, Clark Wilson, Brewer Nash, multi-level security

O10. Describe access control models, including matrix, discretionary, role based, and lattice based.

O11. Describe trust management issues, including distributed trust, blockchain

O12. Describe cybersecurity-related legal issues and ethics.

Outline

Topic	**Lecture Hours**	**Outcome**
Introduction to principles and foundations of cryptography	3	O1, O2
Principles of cybersecurity	4	O1
Secure design principles	4	O2
Software security principles	4	O3
Risk Management	3	O4
Basic risk assessment, security life-cycle	3	O5, O6
Data security concepts and mechanisms	3	O7, O8
Security models	3	O9
Access control	3	O10
Trust management	3	O11
Legal issues and ethics	3	O12

Grading Policy

- Midterm: 30%
- Final Exam: 30%
- Assignments: 30%
- Participation: 10%