

UMBC UGC Program Changes & Other Request: Computer Engineering

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Specifics (see instructions):

The following table compares the requirements of a proposed new Cybersecurity Track with the existing ES and COM tracks. The key difference is in the designated track electives. Most of the courses designated as Cyber track electives or track electives are already either required or currently permitted for the existing CMPE tracks. The offering expands student's choice by inclusion of the multidisciplinary Cybersecurity electives as electives for BS-CMPE degree.

	ES TRK (exist)	COM Trk (exist)	CyS Trk (New)	Notes
CMSC421	CMSC421	CMSC421	CMSC421	already reqd for BS-CMPE
TrkElect	CMPE315	CMPE323	CMSC426	426 already List A for CMPE
TrkElect	CMPE415	CMPE330	CMSC481	481 already List A for CMPE
Elective	List A	List A	CMPE315	already List A for CMPE
Elective	List A	List A	CMPE415	already List A for CMPE
Elective	List A or B	List A or B	CyS Elective	from cross-disciplinary list
Capstone	450/451	450/451	450/451	already reqd for BS-CMPE

Rationale (see instructions):

In conjunction with the B.S. Computer Science and the B. S. Information Systems programs, the Computer Engineering program proposes to add a Cybersecurity Track to its major. Like the Electronic Systems (ES) and the Communication Engineering (COM) tracks, the Cybersecurity (CyS) track will require two track electives, and permit three other electives from lists of selected courses. Rather than use the existing "List A" and "List B" electives, however, the CyS track will require that courses be selected from a list of Computer Engineering, Computer Science and Information Systems courses that have been closely tied to the CS tracks in all three majors. Thus, the three CyS tracks (CMPE-CyS, CMSC-CyS, IS-CyS) will be cross disciplinary, sharing common content while retaining specialized information more appropriate for the Bachelor's degree with which they are associated.

This change was approved at the October 2015 meeting of the CMPE undergraduate program committee and by the CSEE faculty in early November 2015

The key requirements for the track will be;

1. Technical Requirements in Computer Science (CS)

CMSC-421 Principles of Operating Systems, or equivalent courses at other institutions, as determined by the Director. CMPE students already take this course as a requirement. For the purpose of the CyS track in Computer engineering, CMPE481 will be required.

2. Core Cybersecurity Courses

Complete four courses (at least three credits each) at UMBC from the list of approved courses. One of these will be an introductory overview course, tentatively CMSC 426 Introduction to Security. All courses except possibly the introductory course must be at the 400-level or higher. Courses taken at other institutions may not be substituted except with the permission of the director. In the CMPE program, the requirement will be satisfied by two track electives, initially established as CMSC426 and CMSC481, plus two additional List A Electives, initially established as CMPE415 and CMPE315. As the number of Cybersecurity offerings increases, the CMPE program anticipates modifying these requirements to the "two track electives plus two List A elective" formula currently

used by the other tracks in the CMPE program. It is anticipated that this initial set of courses will be modified as the track matures.

3. Practical Hands-On Experience

Document practical hands-on experience in Cybersecurity, as judged by the Director. The CMPE capstone course, with significant security related project component, will satisfy this requirement. CMPE450/451 Capstone I/II are already required for all CMPE majors.

4. The student must pass all of the CyS track courses with a C or better.

a) What are the major departures from the current structure and why is the new structure preferable?

As illustrated in the table, the CyS track is just a reshuffling of courses that are currently either required or permitted toward fulfilling the CMPE major. Thus, the addition of the CyS track reflects a different emphasis, but not a new direction for the program. This different emphasis is in keeping with recent NSA and FFRDC awards to the CSEE Department, and will address a frequently-asked question from new or prospective students.

b) What provisions will be made to accommodate current students if courses are discontinued?

As noted above, the new CyS track draws from a solid foundation of existing courses which have been offered regularly for many (at least five) years. It is expected that courses will be added or eliminated to the CyS interdisciplinary list as appropriate, given the growth and change of technology. The initial list of CyS electives includes Network Security, Information Assurance, Malware, Coding Theory, Field Programmable Logic, VLSI Design, and any course offered in UMBCs CYBER program.

c) If there is a change in required credits, please provide a specific justification for that change.

The proposed CyS track does not change the number of credits required for the CMPE degree. The CMPE degree is currently approved for 128 credits, and currently utilizes 125 credits in the two existing tracks.

If approved, the following text should be added to the Catalog, immediately following the entry for the Communications Engineering Track:

Cybersecurity Track Requirements

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- CMSC426 – Principles of Computer Security (3.00)
 - CMSC481 – Computer Networks (3.00)
 - [CMPE 315 - Principles of VLSI Design](#) (4.00)
 - [CMPE 415 - Programmable Logic Devices](#) (3.00)

Note:

In addition, one technical additional elective is required. This elective can be either from the CMPE electives (List A) or approved CMSC courses (List B) or approved CYBER electives.