Form to Propose New or Change Academic Programs

Type of program (check one): **Major** ☐ **Minor** ☐ **Concentration** ☐ **Certificate** ☐ **Degree** ☐

Other (specify) ☑ Five-year BS/MS Program

New program/curriculum? ☑ **Revision of existing program/curriculum?** ☐

Suspension of existing program/curriculum? ☐ **Termination of existing program/curriculum?** ☐

Department(s) or Program offering this proposal:

Department of Computing Sciences and Department of Electrical and Computer Engineering

Audience of program (check one or more): **Undergraduate** ☑ **Graduate** ☐ **Non-degree** ☐ **Non-credit** ☐

Modality (check one): **On-Campus** ☑ **Other Location** ☐ **100% Online** ☐ **Hybrid** ☐

Budget Model (check one): **Entrepreneurial Program** ☐ **Traditional University Program** ☑

Title and Formal Catalog Description of Program:

Five-year BS CS + MS Cybersecurity

This program allows a student to earn a Bachelor of Science in Computer Science and a Master of Science in Cybersecurity in five years. It is open to current undergraduate Computer Science majors, who typically apply to participate in the second semester of their sophomore year. Participants earn the B.S. degree in the typical four-year time frame and graduate with their class. They then continue their studies in the fifth year to complete the M.S. degree. Normally, earning both degrees would take six years of full-time study. The time savings is achieved by applying three graduate courses to both degrees.

Effective Date Program Begins, Suspends or Terminates (semester and year):

Fall 2020

Instructions:

Minor Changes (e.g. adding or deleting required courses from the program): Attach an explanation of the change and secure all required signatures under "Minor Changes" on the following page.

Terminated or Suspended Programs: Attach an explanation of why the program is being terminated or suspended including the number of affected students and associated teach out plans. In addition, provide details of impacted staff and how their responsibilities are being reassigned as well as associated faculty and any anticipated impact on their load. Also provide a list of affected courses by college and department. Secure all required signatures under "Terminated or Suspended Programs" on the following page.

New or Substantially Revised Programs: Follow the directions for steps one through three on the third page.

Note: If the creation of new courses, or modification of old courses, is required to implement a new or modified program, please use the Changes to Course in the Course Catalog form, either in conjunction with this form or subsequent to the approval of the new or modified program.

REQUIRED SIGNATURES

By signing below, the individual indicates that his/her office has been consulted and has no material reservation about their willingness and ability to support the proposal.

STEP 1 APPROVALS, MINOR CHANGES AND TERMINATED OR SUSPENDED PROGRAMS:

#1 Department Chair: _____ **Date:** _____

#2 Cooperating Department Chair*: _____ **Date:**_____

#3 College Dean: _____ **Date:** _____

#4 Cooperating College Dean*: _____ **Date:** _____

#5 Associate Vice Provost, Fin & Admin:_____ **Date:** _____

#6 Vice Provost for Academics: _____ **Date:** _____

STEP 2 ADVISORY COUNCIL:

This meeting has been scheduled by the Vice Provost for Academics on:_____

at: _____ **in room:** _____

If you have any questions, please contact the Office of the Provost at 610-519-4525.

STEP 3 FINAL APPROVALS FOR NEW OR SUBSTANTIALLY REVISED PROGRAMS:

#1 Department Chair: _____ **Date:** _____

#2 Cooperating Department Chair*: _____ **Date:**_____

#3 College Dean: _____ **Date:** _____

#4 Cooperating College Dean*: _____ **Date:** _____

#5 Additional Signatures (as noted):

_____	_____	_____
Bursar	**Registrar**	**Financial Aid**
_____	_____	_____
UNIT	**Library**	**Other:**_____
_____	_____	_____
Other:_____	**Other:**_____	**Other:**_____

#6 Associate Vice Provost, Fin & Admin:_____ **Date:**_____

#7 Vice Provost for Academics: _____ **Date:** _____

**If there is more than one cooperating department chair or college dean, please attach additional signatures in an appendix.*

Five-year BS CS + MS Cybersecurity Proposal

September 16, 2017. Updated November 25, 2019. Changes.

Summary

The proposed program is simply a track for our BS Computer Science students to obtain a MS Cybersecurity degree with one additional year of study by counting three graduate courses for both degrees. This is similar to our existing five-year programs in Engineering, Computer Science, Biology, and other areas. No new courses, degrees, faculty, or other resources are needed.

Program Description

This program allows a student to earn a Bachelor of Science in Computer Science and a Master of Science in Cybersecurity in five years. It is open to current undergraduate Computer Science majors, who typically apply to participate in the second semester of their sophomore year.

Participants earn the B.S. degree in the typical four-year time frame and graduate with their class. They then continue their studies in the fifth year to complete the M.S. degree. Normally, earning both degrees would take six years of full-time study. The time savings is achieved by applying three graduate courses to both degrees.

To be eligible for this program, students must have strong academic credentials: a cumulative grade point average (GPA) of at least 3.0 and a GPA of at least 3.5 in the major.

Comparison with Existing BSCS/MSCS Program

This program is based on the existing BSCS/MSCS program in which students earn the Bachelor of Science and Master of Science degrees, both in Computer Science, in five years. The proposed program is almost identical to the existing BSCS/MSCS program, and differs only in: (1) the specification of the three graduate courses taken as part of the undergraduate degree; and (2) the requirement of CSC 4900, Computer Networks, or ECE 4470, Computer Networks, as one of undergraduate elective courses.

In the existing BSCS/MSCS program, students take the two graduate courses:

CSC 8310 - Linguistics of Programming Languages
CSC 8510 - Theory of Computability

instead of two undergraduate CSC courses, and they also take a third graduate CSC elective course.

In the proposed program, students take the two graduate courses:

CSC 8301 - Design and Analysis of Algorithms
CSC 8490 - Database Systems

instead of two undergraduate CSC courses, and they also take one graduate ECE cybersecurity course.

Also, in the proposed program, students must take CSC 4900, Computer Networks, or ECE 4470, Computer Networks, as one of their undergraduate elective courses, because this course or equivalent is required for admission to the MS Cybersecurity program.

Relationship with Existing MS Cybersecurity Program

No changes are required in the existing MS Cybersecurity admission or degree requirements to accommodate students in the proposed program.

The MS Cybersecurity program has always accepted students with BS degrees in Computer Science and certain other areas. The admission requirements state:

> *Admission to the Master of Science in Cybersecurity degree program will be granted to qualified students who hold a bachelor's degree in Engineering, Computer Science, Mathematics, or applied sciences from an accredited and/or reputable institution, with a GPA of 3.0 or better.*
> *…*
> *Undergraduate course prerequisite requirements include Villanova ECE 4470, Computer Networks, or equivalent.*

For admission to the MS Cybersecurity program, CSC 4900 is considered equivalent to ECE 4470. And the two CSC graduate courses to be taken by undergraduate students in the proposed five-year program, CSC 8301 and CSC 8490, are approved electives in the MS Cybersecurity program.

There are existing five-year BS/MS programs in all engineering areas at Villanova, including BS/MS Computer Engineering, and BS Computer Engineering + MS Cybersecurity. The engineering MS online application process would not require any changes for the new five-year program. Students would just select the MS Cybersecurity and submit their Villanova transcript as usual. There is nothing hard-coded in the application process that refers to any particular undergraduate degree requirement.

Enrollment Analysis

Since the proposed program is open only to current undergraduate Computer Science majors, it will not change the current number of CSC majors, though in the long term it may attract more undergraduate CSC applications.

The program is expected to attract students who may have pursued the MS Cybersecurity anyway after the BS Computer Science, and will choose the five-year program as simply a faster way to obtain the same degrees.

CSC course enrollments will be redistributed slightly, since the students will substitute two CSC graduate courses for two CSC undergraduate courses, which is also true for the existing BSCS/MSCS program. Students will also substitute one MS Cybersecurity course for an undergraduate CSC elective course, which will shift a small number of enrollments from CSC electives to MS Cybersecurity courses.

Attachments

Attached are descriptions for the proposed program and the existing BSCS/MSCS and BS CPE + MS Cybersecurity programs.

Proposed Five-Year BS CS + MS Cybersecurity

This program allows a student to earn a Bachelor of Science (B.S.) in Computer Science and a Master of Science (M.S.) in Cybersecurity in five years. Students in this program must satisfy all requirements of the Computer Science major, except that they:

Take	Instead of
CSC 8301 - Design and Analysis of Algorithms	CSC 1700 - Analysis of Algorithms
CSC 8490 - Database Systems	CSC 4480 - Principles of Database Systems

and must take CSC 4900 - Computer Networks, or ECE 4470 - Computer Networks, as one of the electives.

Participants can also use a third graduate course to fulfill an elective for both degrees. Any approved elective for the M.S. degree can be used for this purpose. These substitutions give the student a head start on satisfying the remaining M.S. Cybersecurity degree requirements.

To be eligible for these programs, students must have strong academic credentials: a cumulative grade point average (GPA) of at least 3.0 and a GPA of at least 3.5 in the major. The GRE exam is waived.

Existing BSCS/MSCS Program

BSCS/MSCS Five Year Program

This program allows a student to earn a Bachelor of Science (B.S.) in Computer Science and a Master of Science (M.S.) in Computer Science in five years. Students in this program must satisfy all requirements of the Computer Science major, except that they:

Take	Instead of
CSC 8310 - Linguistics of Programming Languages	CSC 1800 - Organization of Programming Languages
CSC 8510 - Theory of Computability	CSC 4170 - Theory of Computation

Participants can also use a third graduate course to fulfill an elective for both degrees. Any approved elective for the M.S. degree can be used for this purpose. These substitutions give the student a head start on satisfying the remaining M.S. Computer Science degree requirements.

To be eligible for these programs, students must have strong academic credentials: a cumulative grade point average (GPA) of at least 3.0 and a GPA of at least 3.5 in the major. The GRE exam is waived.

Existing BS CPE + MS Cybersecurity Program

Five-Year BS/MS Program in Computer Engineering

Full-time undergraduate students with a minimum GPA of 3.00 have the option of applying for admission into the five-year combined Bachelor of Science in Computer Engineering/Master of Science in Computer Engineering or the Bachelor of Science in Computer Engineering/Master of Science in Cybersecurity program.

Students will earn a BS degree after four years of study and complete the 30-credit requirement for the MS degree with one additional year of work.

Typical Five-Year Plan

- Complete three graduate courses (9 credits) during senior year.
- Complete the remaining 21 credits of graduate study over the 12-month period following the senior year.
- All graduate courses in this program must be taken at Villanova University.
