

# CSS - 3753 - Computing and Security for Manufacturing

## zo8. UG Course Modification #2 (Substantive College/School)

### Due Dates

Deadlines for curriculum can be found:

[Curriculum SharePoint](#)

[Curriculum Website](#)

[Procedural Calendar](#)

On your Curriculog dashboard under 'My Upcoming Events'

In order to meet the deadline, this proposal must be on the *Substantive College/School Level Review* step on or before the listed due date.

### Directions for Form

Please read instructions and information below before you begin your curriculum proposal. You may also consult the following resources which can provide additional assistance in understanding this form and the curriculum process.

Originator How-To Guide

[Curriculum SharePoint](#)

[Example Proposal](#)

This form **SHOULD** be used for the following:

Modifying a course **without** a special designation (General Studies, Service Learning, Multicultural, or Senior Experience).

Converting an omnibus or individual variable topic course to a regular course.

This form **SHOULD NOT** be used for the following:

Modifying a course with a special designation (General Studies, Service Learning, Multicultural, or Senior Experience).

Creating a new course with or without a special designation (General Studies, Service Learning, Multicultural, or Senior Experience).

Changing a course prefix or changing the ownership of a course.

Modifying or creating graduate courses.

## Instructions:

Import the course you wish to modify with the import button at the top of this page.

Fill in the required information in the following fields:

Originator Name and Email

Curriculum Proposal Justification and Resource Implication Subsection

Review for Conflict and Overlap (end of form)

Launch the Proposal

**DO NOT MAKE CHANGES TO YOUR PROPOSAL UNTIL AFTER YOU LAUNCH THE PROPOSAL** in order to track changes. Failure to use the track changes feature may cause a delay or denial of your proposal.

Modify course components as needed

Approve the proposal

Use the checkmark icon on the right of the screen to approve the proposal.

## Additional Information

You may collapse individual sections of this form by clicking the arrow or "V" icon to the right of the section title.

All fields that are marked with an asterisk (\*) are required.

Each section may have additional directions attached. Please follow instructions. Proposals that are incomplete or filled out incorrectly will be returned to the originator.

If you have questions or need assistance in filling out this proposal form, you may contact the [Director of Curriculum and Catalog](#).

### Department and Originator Information

College/School:\*

College of Health and Applied Sciences

Department:\*

Department of Computer Sciences

Name of Proposal Originator\* Steve Beaty

Email of Proposal Originator\* beatys@msudenver.edu

## Curriculum Proposal Justification and Resource Implication

**Justification and Rationale for Curriculum Proposal:\***

In working with the AMS department, we found that students are not properly prepared for CSS 1751. We're modifying the prereqs and therefore the number.

**Resource Implication Narrative:\***

None, this course is already being taught.

**Related Curriculum Proposals:\***

N/A.

Please select from the below list all of the course modifications you are making. If you wish to change something that is not listed, please refer to the other course modification forms in Curriculog. **Please do not make changes to fields you do not specify are being modified and make sure to list ALL fields that you modify.**

**Note: This form CANNOT be used to change courses with special designations (Multicultural, Service Learning, Senior Experience, General Studies)**

**Course Modifications:\***

Banner Enforced prerequisites, corequisites, pre/corequisites

Course number

Evaluation of student

Minimum passing grade Banner enforced prerequisites, corequisites, pre/corequisites

Outline

Prerequisites, corequisites, pre/corequisites

Required reading

Student Behavioral Learning Objectives (SBLOs)

**Impact Report Results:\***

This will have an impact on the AMS courses vis a vis their required courses and prerequisites and we've been working with them on this change.

## Impact Report for CSS 3753

There are no results for this report.

**Reminder: DO NOT MAKE CHANGES TO YOUR PROPOSAL UNTIL AFTER YOU LAUNCH THE PROPOSAL in order to track changes. Failure to use the track changes feature may cause a delay or denial of your proposal.**

## Course Title Information

Prefix:\*

Course Number:\* 3753

**Course Title:\*** Computing and Security for Manufacturing

**Transcript/Banner Course Title:\*** Computing and Security for Mfg

**Course Type:\***

**CIP Code:** 11.1003

## Course Hours, Restrictions, and Repeat Information

**Please check all that apply from the selections below. You may select more than one option if applicable.**

- Check All that Apply:\***
- Required for Major
  - Required for Minor
  - Required for Concentration
  - Required for Certificate
  - Elective
  - Specified Elective

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

***Federal Credit Hour Definition:*** A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:

*(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward to the award of credit hours. 34CFR 600.2 (11/1/2010)*

**Credits:\*** 3

**Distribution of Credits:\*** (3 + 0)

**Schedule Type(s):\***

**Grade Mode(s):\***

Face-to-Face or Equivalent Hours per course

Consult Appendix B and C of the [Curriculum Manual](#) to determine the hours for the course

Lecture: 45

Lab:

Internship:

Practicum:

Other Hours:

Additional Student 90  
Work Hours:

**Please answer yes or no to the below questions. If you answer yes to any of the questions, please fill out the related field on the right.**

Is this course a specified repeatable course? \*  No  Yes

If yes, indicate specified repeatable number of credits and/or repeats allowed:

A specified repeatable course is a course that allows a student to repeat the course either in its entirety or for a certain identified total number of credit hours. If you decide to make your course repeatable, please specify either how many times a student can repeat the course for credit, or for the total number of credits they can receive.

Is this course a variable topics umbrella course? \*  No  Yes

If yes, indicate variable topic number of credits and/or repeats available:

Are there course equivalencies? \*  No  Yes

If yes, list all equivalent courses:

A crosslisting is when a course is made available under additional prefixes for students in other programs.

An equivalency is when two courses are coded in Banner to be equal to each other.

Generally equivalencies are used when an old, archived course is needed to be equal to a new course. Crosslistings are used for all active courses. Supporting documentation should be included to demonstrate approval for crosslistings.

Are there course crosslistings? \*  No  Yes

If yes, list all crosslistings:

### Registration Restrictions

Program:

Major:

Level:

Class:

Student Attribute:

**The following fields will allow you to attach prerequisites, corequisites, or prerequisites or corequisites to your course. Please specify if you want and of these prerequisites, corequisites, or prerequisites or corequisites Banner enforced.**

**Banner enforcement means that the requirement will be enforced when the student attempts to register for a course. If you do not Banner enforce the requirement, the system will not check the student's record for the requirement to be met.**

**Please also indicate the minimum passing grade. If you do not indicate a minimum passing grade, it will default to a "D-" and you will be required to complete another curriculum proposal to modify this minimum passing grade, even if your program has a different minimum passing grade.**

**Prerequisite(s):** CSS 2751

**Banner Enforced Prerequisite(s):** CSS 2751

**Minimum Passing Grade for Banner Enforced Prerequisite(s):** C- or T

**Corequisite(s):**

**Banner Enforced Corequisite(s):**

**Prerequisite(s) or Corequisite(s):**

**Banner Enforced Prerequisite(s) or Corequisite(s):**

**Minimum Passing Grade for Banner Enforced Prerequisite(s) or Corequisite(s):**

**Catalog Course Description:\*** As all aspects of manufacturing have become computerized, it is important that everyone involved become knowledgeable in computing in general and computer security specifically. This course gives a overview of what computing is and how programming is done. It covers how computers are connected to networks and the related networking protocols. It emphasizes manufacturing-specific concerns such as Industrial Control Systems and the Supervisory Control And Data Acquisition (SCADA) technology, protecting intellectual property at all phases, and assuring the software supply chain.

**The note field DOES show up in the course listing in the university catalog. A note should be made in specific instances where additional information about a course needs to be conveyed to students. The most common reasons for adding a note are:**

The course is crosslisted Example: *(Note: Credit will be granted for only one prefix.)*

Variable credit courses Example: *(Note: Variable Credit)*

A course is repeatable Example: *(Note: This course may be repeated up to 3 times under different topics) OR (Note: This course is repeatable for a maximum of six semester hours)*

If a student cannot take two courses and earn credit for both Example: *(Note: Students cannot earn credit for XXX1234 and XXX2345)*

**Note:**

**Lab Fees:**

**Field Trips:**

## Course Content

The following section is the course content. You must adhere to the following format for each section:

**Required reading: Smith, J.R. (2014). *Book of Examples*. New York, NY: McGraw-Hill**

**List each material in this format. If there are multiple materials please format them in a bullet or list style**

**Specific Measurable Student Behavioral Learning Objectives: 1, a, i, ii, etc.**

**Detailed Outline of Course Content or Outline of Field Experience/Internship: I, A, 1, a, etc.**

**Evaluation of Student Performance: 1, a, i, ii, etc.**

**You must use the numbering list feature within the toolbar above each field. Right click on a number in the list and select "Numbered List Properties" to change the numbering style to adhere to the above formatting requirements.**

**Reminder: DO NOT MAKE CHANGES TO YOUR PROPOSAL UNTIL AFTER YOU LAUNCH THE PROPOSAL in order to track changes. Failure to use the track changes feature may cause a delay or denial of your proposal.**

**Required reading and other materials will be equivalent to:\***

Knapp, E. D. & Langill, J. T. (2011), *Industrial Network Security*, Second Edition: *Securing Critical Infrastructure Networks for Smart Grid, SCADA, and Other Industrial Control Systems*, ISBN-13: 978-1597496452

**Specific, Measurable  
Student Behavioral  
Learning Objectives:\***

Upon completion of this course the student should be able to:

1. Appraise the risks associated with the various software assets for manufacturing.
2. Assemble a set of controls to mitigate the computer security risks discovered.
3. Assess the variety of connections made to and within a manufacturing organization.
4. Construct a training program for a manufacturing organization.
5. Evaluate the types of programming performed and recommend appropriate security controls.
6. Analyze and manage the software supply chain.
7. Explain the basics of computer programming and networking.
8. Assess an organization's approach to ethical behavior.

**Detailed Outline of  
Course Content  
(Major Topics and  
Subtopics) or Outline  
of Field  
Experience/Internship \***

1. Introduction to computing

1. Programming

1. Variables
2. Conditionals
3. Loops
4. Objects
5. Security issues

2. Networks

1. Packets
2. Topology
3. The Internet Protocol versions four and six
4. The Transmission Control Protocol
5. The User Datagram Protocol

2. Pervasive computing

1. Everything connected, and therefore vulnerable
2. Access and monitoring devices
3. Mobile device security

3. Necessary infrastructure

1. Water and waste water
2. Electricity
3. Telephony
4. Network providers
5. Emergency services

4. Manufacturing threats

1. Denial Of Service/production interruptions
2. Destruction of equipment and product.
3. Industrial espionage

5. The software supply chain

1. Securing software
2. Third party integrations

6. Securing intellectual property

1. Legal protections
2. Policy and procedural protections
3. Technical protections

7. Insider threats

1. Innocuous versus malicious
2. Securing the human

8. Industrial Control Systems

1. Embedded controllers
2. Networking

9. Supervisory Control And Data Acquisition (SCADA)

1. Threats
2. Connections
3. Isolation techniques

10. Securing hosts

1. Malware detection and mitigation
2. Authentication
3. Authorization

11. Securing the network

1. Intrusion detection and prevention systems
2. Firewall
3. Monitoring and analysis
4. Partitioning

12. Computing ethics

1. Privacy
2. Anonymity
3. Proper use

**Evaluation of Student  
Performance:\***

1. Required: a midterm and final exam and four papers.
2. Optional: quizzes, participation, classwork, homework, projects.

## Review for Conflict and Overlap

According to the Undergraduate Curriculum Manual, it is the responsibility of both the originator as well as each level of review to consider potential overlap and curriculum conflict. Any potential overlap or conflict with existing curriculum should be reviewed, and the impacted department(s) should be requested to provide a letter of notification or support, depending on the circumstances. Full information on overlap/conflict can be found [here](#).

Attach documentation that supports affected Departments were notified and/or provided support of the proposed changes in the Proposal Toolbox by clicking on the paperclip icon on the right side of the form.

**Please Confirm That:**\*  I, the originator of this proposal, have completed the necessary due diligence to review this proposal for any potential overlap and/or conflict with existing curriculum. Any departments identified as having potential overlap and/or conflicts have been contacted and a letter of notification and/or a letter of support has been obtained.

### **Academic Affairs and Registrar's Office Use Only**

**Notes** Director added prerequisites, minimum passing grade, required reading, SBLOs, outline, evaluation to the specify course modification field.

This course modification will be effective for the University 2022-2023 Undergraduate Catalog and will be reflected in Banner beginning in Fall 2022.

*Form Revised May 2021*