

Course Syllabus Outline - Spring 2018 Semester:
ENGR 580A4, Cybersecurity for Systems Engineers 12/19/17

<p>Instructor Information</p>	<p>Dr. John M. "Mike" Borky</p> <p>Office Location: Colorado Springs, Colorado Phone: (719) 640-8423 E-mail: Mike.Borky@colostate.edu Office Hours: By Appointment, primary interactions via Email and phone</p>
<p>Required Texts</p>	<p>A <i>Cybersecurity Notes</i> file prepared by the instructor and posted on Canvas will be the primary reference for the course. Supplementary notes and materials will be distributed.</p>
<p>Course Description</p>	<p>This is a core, introductory graduate course primarily for students in Systems Engineering, whose principal objectives are:</p> <ul style="list-style-type: none"> • To equip System Engineers and other interested technical professionals with a basic grounding in Cybersecurity, • To enable general System Engineers to integrate Cybersecurity concerns and activities into all phases of an overall Systems Engineering process flow, • To enable these same System Engineers to interact with Cybersecurity specialists and to employ their expertise in achieving robust and resilient secure system solutions, and • To provide a foundation for students seeking advanced education and research opportunities in Cybersecurity by teaching and practicing the fundamentals of the discipline. <p>The course is organized by the Cybersecurity Domains of the Computer Information System Security Professional (CISSP) Common Book of Knowledge (CBK). Students will apply the material covered in projects of their choice.</p> <p>Administratively, this is a CSU Online course and uses the Canvas system for information dissemination, posting assignments, and other course mechanics.</p>
<p>Course Objectives and Learning Outcomes</p>	<p>Upon successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> • Demonstrate understanding of basic Cybersecurity principles and correctly employ associated terminology, • Perform basic security risk analysis on typical systems and formulate a Security Concept of Operations (SECOPS) and System Security Plan (SSP) based on threats and available safeguards or countermeasures, • Develop clear, effective and verifiable security requirements and an approach to security governance, • Apply a Defense-in-Depth strategy with selected security controls at various levels of a secure system architecture, • Define effective strategies for access control, communications and networking security, and cryptography, plus demonstrating key aspects of implementing those strategies,

	<ul style="list-style-type: none"> • Understand the elements and practices of a Secure Software Development Life Cycle (SSDLC), and • Define effective strategies for security operations, physical security, administrative security, and organizational continuity and disaster recovery.
Prerequisite	ECE501/ENGR501, Foundations of Systems Engineering or equivalent job experience or coursework
Credit Hours	3
Teaching Strategies	<ul style="list-style-type: none"> • Classroom instruction using mixed media to present content and examples and a team-teaching approach with guest lecturers on specific specialized topic. • Student-selected projects and associated homework assignments. • Students are encouraged to ask questions, both in and outside class, and to share relevant work experiences.
Course Policies and Procedures	<p>Classroom (Online, Campus, Blended) Procedures:</p> <p>Attendance: This course is presented in a blended format, which allows for flexibility in formal student attendance. It is acceptable for students to synchronously attend the course from a distance, as well as by physically being in the classroom during class time. It is also acceptable for students to attend purely asynchronously by watching the recorded course sessions and participating solely during non-standard academic hours. Students may select their mode of participation from week to week without giving prior notification to the instructor; however, students should register for the In-Class or Online Sections based on their primary mode of participation. Regardless of the method of attendance the student selects, all requirements of the course, especially the class project, must be met.</p> <p>Academic Honesty: This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog, the Graduate and Professional Bulletin, and the Student Conduct Code. All students in the course will be subject to the policies including those governing academic integrity, stated in the "Student Responsibilities" section of the Colorado State University General Catalog (http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/).</p> <p>Each student is responsible for his or her work. When a student puts her or his name on an assignment and turns it in for a grade, she or he makes an implicit statement that she or he understands and has applied the concepts that are demonstrated in the assignment. Students may cooperate in preparing for examinations but may not share answers or receive outside assistance during a test. Presenting work that is not original or that the student does not understand is justification for failing the course and/or facing disciplinary action by the university.</p>

CSU Student Honor Pledge

"I have not given, received, or used any unauthorized assistance."

Please see: <http://tilt.colostate.edu/integrity/>

for more information on the CSU policy regarding academic integrity.

Late work & Educational Responsibility: All assignments and examinations must be completed by the due date unless an alternate due date has been previously approved or documentation has been provided to confirm extreme circumstances. It is the student's responsibility to communicate with the instructor about extreme circumstances or questions concerning assignments or examinations and due dates.

Class Projects: An essential element of the learning experience in this course is completion of a project that deals with a system or enterprise of interest to the student and allows the concepts and methods taught in the course to be practiced. Projects associated with student employment or past experience are often best, but this is not mandatory. Projects must have sufficient content and complexity to allow demonstration of all the essential skills taught in the course. The instructor will approve project proposals before work begins.

Etiquette (Classroom and Online): This is a traditional lecture course, and normal professional courtesy is expected both in class and in external interactions. Questions and discussion are strongly encouraged, and very effort will be made to resolve issues as they arise. However, questions that are not of general interest may be deferred to a private session with the instructor. Please refrain from using cell phones or other disruptive electronic devices while attending class, and please silence all sounds made by such devices while class is in session.

E-mail Procedure: The instructor will be as available as possible before and after class for discussions and questions. However, much student-teacher interaction will necessarily be via e-mail. Students are encouraged to send as many questions, comments or concerns as they like. The instructor's CSU e-mail is the primary and should be used whenever possible. Professional courtesy, including avoidance of broadcast messages that are not appropriate to all recipients, is expected. Sending e-mail that violates the rules stated above or standards defined by the University may result in disciplinary actions.

Academic Policies

Assignments: In general, homework is assigned on a weekly or bi-weekly basis and consists of applying specific course content to student projects. It is important that assignments be completed on time, and late submittals will only receive credit if advance approval is obtained or truly extraordinary situations beyond the control of a student occur. The instructor will provide feedback on project assignments and students can both correct and expand their work before the final submittal. Project content that exceeds minimum requirements is eligible for extra credit.

Examinations: There will be Midterm and Final Exams. Both will be take-home tests that operate much like normal assignments, accessed

via Canvas, except that there will be strict time windows during which the exams must be completed. Material eligible to be included in exams is cumulative from course start to the week before the exam.

Intellectual Property: Any intellectual property developed or used in the course will be subject to the policies stated in Section J.12, "Academic Materials," of the Colorado State University Faculty Manual (http://facultycouncil.colostate.edu/faculty-manual-section-j#j_12).

Grading Policy: Projects and assignments will be submitted through Canvas in the assignment area for each week. Assignments will not be accepted via email unless explicitly approved by the instructor. All assignments related to class must be posted in order to be graded.

Grading Scale: Grades are based on each student's demonstration of mastery of the concepts and skills taught in the course. That competence is assessed based on the factors and percentages below under Evaluation Breakdown

This class uses a traditional A-F (4.0-0.0) grading system, with grades assigned on the following basis:

"A" – student has demonstrated understanding and proficiency in all essential concepts and techniques

"B" – student has demonstrated substantial understanding and proficiency, but some test results and submitted products are deficient in one or more material aspects

"C" – student has demonstrated basic understanding and proficiency but has failed to show this in one or more essential concepts and techniques

"D" – student has shown major deficiencies and demonstrated only a rudimentary understanding of course material

"F" – student has failed the course

"+" and "-" Grades – allow finer-grained recognition of study achievement.

Numerical scores will be computed from the factors and percentages in the Evaluation Breakdown and compared to the above criteria. A rough indication of the scores corresponding to letter grades is as follows:

GRADE	COURSE CREDIT	NUMERICAL EQUIVALENT*
A	4.0	93-100
A-	3.7	90-92.9
B+	3.3	87-89.9
B	3.0	83-86.9
B-	2.7	80-82.9
C+	2.3	77-79.9
C	2.0	73-76.9

	<table border="1"> <tr> <td data-bbox="456 197 704 243">D</td> <td data-bbox="704 197 1065 243">1.0</td> <td data-bbox="1065 197 1539 243">60-65.9</td> </tr> <tr> <td data-bbox="456 243 704 289">F</td> <td data-bbox="704 243 1065 289">0</td> <td data-bbox="1065 243 1539 289">0-59.9</td> </tr> </table> <p>* Scale may be adjusted to account for overall class performance.</p>	D	1.0	60-65.9	F	0	0-59.9				
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Technical Support	<p>If you have a technical question regarding Adobe Connect, please email or call Jeff Dotson, Jeff.Dotson@colostate.edu/ 970-491-2290, or Ed Gudemann ed.gudemann@colostate.edu/ 970.491.3234. Please indicate the nature of the problem in the email.</p> <p>If you have a technical question regarding Canvas, please contact the Morgen Library Help Desk, (970) 491-7276, help@colostate.edu</p>										
Evaluation Breakdown	<table border="1"> <thead> <tr> <th data-bbox="561 606 922 646">ITEM</th> <th data-bbox="922 606 1435 646">PERCENT OF TOTAL SCORE</th> </tr> </thead> <tbody> <tr> <td data-bbox="561 646 922 682">Weekly Assignments</td> <td data-bbox="922 646 1435 682">10%</td> </tr> <tr> <td data-bbox="561 682 922 718">Midterm Exam</td> <td data-bbox="922 682 1435 718">25%</td> </tr> <tr> <td data-bbox="561 718 922 753">Final Exam</td> <td data-bbox="922 718 1435 753">35%</td> </tr> <tr> <td data-bbox="561 753 922 789">Class Project</td> <td data-bbox="922 753 1435 789">30%</td> </tr> </tbody> </table>	ITEM	PERCENT OF TOTAL SCORE	Weekly Assignments	10%	Midterm Exam	25%	Final Exam	35%	Class Project	30%
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Venue Information	<p>Term Start: January 16, 2018, 5:15-8:00 PM MDT.</p> <p>Venue: For this semester, this course will be offered only online via Zoom with no in-class section.</p>										
Session Structure	<p>General Course Session Structure:</p> <table border="1"> <tr> <td data-bbox="456 995 764 1066">5:15-6:30 pm</td> <td data-bbox="764 995 1539 1066">First Half of Weekly Presentation</td> </tr> <tr> <td data-bbox="456 1066 764 1138">6:30-6:45 pm</td> <td data-bbox="764 1066 1539 1138">Break</td> </tr> <tr> <td data-bbox="456 1138 764 1201">6:45-8:00 pm</td> <td data-bbox="764 1138 1539 1201">Second Half of Weekly Presentation</td> </tr> </table>	5:15-6:30 pm	First Half of Weekly Presentation	6:30-6:45 pm	Break	6:45-8:00 pm	Second Half of Weekly Presentation				
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Course Schedule:

Module	Date	Topics
1	1/16/18	Introduction and Course Overview
2	1/23/18	The Cybersecurity Environment
3	1/30/18	Security Policy, Risk Analysis, and Governance
4	2/6/18	Secure Architecture and Design (1)
5	2/13/18	Secure Architecture and Design (2)
6	2/20/18	Basics of Cryptography
7	2/27/18	Access Control and User Authentication
8	3/6/18	Midterm Exam
	3/13/18	Spring Recess
9	3/20/18	Communications and Network Security (1)
10	3/27/18	Communications and Network Security (2)
11	4/3/18	Secure Software Design Lifecycle
12	4/10/18	Security Operations
13	4/17/18	Security Against Physical and Legal Threats
14	4/24/18	Secure System Testing
14	5/1/18	Special Topics, Course Review, Reserve Class
	5/8/18	Final Exam

NOTE: Schedule may change due to availability of guest lecturers, weather events, and other contingencies.