MEMORANDUM 7 JAN 2020

From: CDR Paul Frontera, USN, PhD
To: SY202, Section 1121 and 3321
Subj: **SY202, CYBER SYSTEMS ENGINEERING COURSE POLICY STATEMENT**
Ref: (a) ACDEANINST 1531.58 (Administration of Academic Programs)
(b) ACDEANINST 1531.82 (Course Policy and Syllabus Content)
(c) USNANINST 1531.53B CH-1 (Policies Concerning Graded Academic Work)
(d) USNAINST 1610.3L (Brigade Honor Program)

1. General. Per references (a) through (d), this is my course policy statement for SY202 (2-2-3). Prerequisites for this course are: SY201, SM223, SP211. This information supplements the basic guidance provided in these references.

2. Course Objectives. This course provides students with an enhanced understanding of basic tools and techniques of cyber systems engineering. Each student will be required to comprehend fundamental cyber physical and communications systems. At the completion of the course, the student will be able to:

a. Understand tools and techniques used in the design and analysis of cyber-controlled engineering systems
b. Identify and discuss advantages and disadvantages—including cyber vulnerabilities—related to cyber-physical systems
c. Understand and differentiate the notion of open and closed-loop control
d. Apply linear modelling techniques to model simple control systems and predict system response
e. Synthesize a simple control system using a microcontroller, actuators, and sensors
f. Understand and synthesize analog, digital, and serial peripherals as part of a simple embedded system
g. Design, implement, and evaluate a linear control system in a microcontroller to regulate a physical system, while meeting some specific performance criteria
h. Understand the topology, actions, and cyber vulnerabilities—as well as the impact of malicious attacks—within a supervisory control and data acquisition (SCADA) system
i. Basic knowledge on the use of wireless communication and how to affect a cyber-physical system
j. Have a basic knowledge of and familiarity with:
    i. MATLAB dynamic simulation capabilities, including SIMULINK
    ii. C programming language
    iii. Microcontroller hardware, firmware, and software
    iv. Serial communication
    v. Power supplies
    vi. Analog, digital, and serial sensors

3. Textbook. Students are required to acquire an mbed NXP LPC1768 microcontroller. There is no required textbook. Lectures notes and supplemental material will be disseminated through a GAfG Drive Folder. The following is a list of text recommendations for further reading on the subject material.

- Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 5e, William Bolton
- Control Systems Engineering, 7e or 8e, Norman S. Nise
- Principles of Naval Weapons Systems, 2e, Craig Payne
- C Pocket Reference, Peter Prinz and Ulla Kirch-Prinz

4. Grading. The interim and final course grades[†] will be based on the following *approximate* weights:

Homework/Quizzes	10%
In-Class Exams (2)[‡]	30% (15% each)
Lab Reports	15%
Term Projects	15% (5% Project 1/10% Project 2)
Final Exam[‡]	30%

[†]Preparation, alertness, participation, and performance in the classroom and laboratory will be subjective factors that may raise or lower your grades. Passing grades on the final project and exam are required to pass the course.
[‡]If for any justified reason you missed an In-Class Exam, the weight of that exam will be added to the Final Exam.

Grades will be posted in Blackboard. The cumulative course averages required to receive a passing grade are defined as follows: A: $\geq 90\%$ B: $\geq 80\%$ C: $\geq 70\%$ D: $\geq 60\%$

5. Academic Integrity. The Honor Concept of the Brigade of Midshipmen states, "We ensure that work submitted as our own is our own, and that assistance received from any source is authorized and properly documented." Students shall assume the policies regarding collaboration detailed in reference (c) are in effect unless otherwise specified in writing. Suspected violations of academic integrity, including plagiarism and cheating, will be handled in accordance with reference (d).

6. Coursework. All work (e.g., homework, quizzes, and exams) must be neat, organized, with the FINAL ANSWER IN A BOX. Partial credit can only be assigned to work that is legible. Ensure that the first page of all assignments contains your full name, the assignment number, and the course/section numbers at the top. Assignments performed outside of the classroom should normally be submitted as a single PDF file to the GAfG Drive folder. Hard copy, handwritten work may be submitted if unable to transmit electronically. All coursework submitted for a grade must clearly display the signature, either handwritten or digital using the common access card, of the individual(s) submitting the work as her/his own, unless otherwise directed.

a. Homework. Written homework will be assigned and collected (uploaded to a GAfG Drive folder in PDF format) for grading. I may grade only select problems from the assignment. Collaboration with other students and the use of outside references is permitted and encouraged. Acknowledge any help you received. Direct copying of assignments is not permitted and constitutes plagiarism. Homework assignments are due no later than the start of class on the specified date.

b. Lab Projects/Lab Reports. Lab projects can be worked in groups of two, with a single report. However, each midshipman should have a copy of all programs, data, plots, and work done in the labs (I may ask for the material and evidence at any moment). I strongly suggest creating a GAfG Drive folder and maintaining a lab notebook to keep track of your work. Lab reports are due at the beginning of the next laboratory session. A template for formal reports will be provided in the GAfG Drive Folder. The report must be computer-typed (including equations, if included) and submitted in PDF format.

c. Exams and Quizzes. Two formal 50 minutes exams will be held in class as scheduled on the syllabus. If you must be absent the day of the exam with a justified reason, it is your responsibility to notify me in advance. NO make-up tests will be given for missed exams without prior arrangements, instead the weight of a missed exams will be added to the Final Examination. There will be one Final Exam of 3 hours. Announced and unannounced quizzes will be given in this class. Calculators and any additional designated handouts are required for all quizzes and exams. Sharing of these items is not permitted during quizzes and/or exams.

d. Late Work. It is your responsibility to submit the homework and lab reports on time (on or before the due date). Contact me to request an extension in advance of the due date (no later than one day prior) if there are extenuating circumstances. Work not turned in on time will not receive credit. However, material covered in the labs is cumulative; successful completion of the final project will require skills learned through each lab.

7. Conduct in Class and Lab. An environment of mutual respect is essential. Participants in the course (including faculty, staff, and midshipmen) shall be treated with respect and dignity. In addition, it is not permitted to sleep or engage in idle talk during lectures. Cellphones should be off and put away. Laptops are not permitted during lecture unless otherwise instructed. Do not leave a lab period without checking with your instructor. The section leader is responsible to call the class to attention at the beginning and end of class. Inform me of any absences. In the event that I am more than ten minutes late for class, the section leader/assistant section leader will take roll. He/she will email-me a list of people that were absent immediately after the class. All students are to remain for the full assigned time, working either in the classroom or in the laboratory. The remainder of the class should be used for the solution of assigned homework and/or study. Class is NOT CANCELLED.

8. Absences. You are responsible for the material covered and homework assigned during your absence, including movement orders. You are required to turn in any work that is due on the day of your absence, unless an alternate arrangement is made, prior to the due date. If you anticipate an excused absence, let me know in advance. Make-up quizzes will not be given if you are absent from class. The weight of missed in-class exams will be added to the final exam unless prior arrangements were made. Your responsibility is to submit any course work ON TIME and to obtain notes and announcements from another class member for classes you have missed. Special situations (e.g. medical emergencies) will be handled on a case-by-case basis.

9. Communications/Extra Instruction (EI). My primary means of communication with you outside the classroom will be via email. Check it frequently. I will distribute materials electronically for the course using a GAfG Drive folder. Any time you are having difficulty with the course material, I encourage you to seek EI. It is best to call or e-mail to schedule a specific time or date (or see me at the end of class). Otherwise, feel free to drop by my office if you just need a few minutes. My regular schedule will be available in the GAfG (under Admin Subfolder). Come prepared with specific questions.

10. Contact Information.

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