FLORIDA ATLANTIC UNIVERSITY
Department of Ocean & Mechanical Engineering
EOC1665 – Introduction to Ocean Engineering and Underwater Vehicles
Summer 2015 (3 credits)

COURSE SYNOPSIS:

A hands-on course designed to introduce the field of Ocean Engineering as applied specifically to robotic marine vehicles. Course topics include: forces and moments, basic electric circuits, DC motors, compasses, micro-controllers, engineering design, and basic engineering measurements and analysis. To strengthen the learning process, students will apply these concepts to designing and building autonomous surface vehicles (ASVs).

INSTRUCTORS: Dr. Edgar An 561-297-2792 pan@fau.edu

MENTORS: TBD

LOCATION
Undergraduate Laboratory (EG 157)
Classroom #2 (EG 162)

CORRESPONDENCE FAU Blackboard
TEXTBOOK None
TERM PROJECT Autonomous Surface Vehicle Design

GRADING POLICY

Class Performance (30%)
• 10% Attendance & in-class performance
• 10% Homework
• 10% Final Exam (Date: TBD)

Engineering Design & ASV Project (70%)
• 10% Group Project Design Review Presentation (Date: TBD)
• 20% Group Project Final Report (Date: TBD)
• 20% Group Project Final Design Presentation (Date: TBD)
• 20% Teamwork (peer & instructor assessment)

GRADING SCALE

The following grading scale will be adopted for this class, and students are explicitly warned that there is no curving in grades. They are expected to monitor their class performances and determine whether the results meet their expectations. When the overall score of a student is
at the borderline between grades, the instructor has the discretion to decide a grade based on the student’s performance and participation level shown in the class.

≥ 90     A
86.7 – 90.0  A–
83.3 – 86.7  B+
80.0 – 83.3  B
76.7 – 80.0  B–
73.3 – 76.7  C+
70.0 – 73.3  C
66.7 – 70.0  C–
63.3 – 66.7  D+
60.0 – 63.3  D
56.7 – 60.0  D–
< 56.7     F

COURSE OUTCOMES
After completing the course, students will have developed the ability:
1. To apply the basic knowledge of math and science to an engineering project
2. To have a basic understanding of an engineering design process
3. To understand team working challenges
4. To carry out basic data analysis
**General Classroom Policy**

**Professional behavior is expected in the classroom.** The use of cellular phones, pagers, or other personal communications devices while class is in progress, or during tests, will not be tolerated. If you must have them, please turn audible ringers off and take conversations outside of class. The class is asked to respect the rights of other students and the instructor and to avoid conversations and disturbances during class.

**Attendance is required for all classes.** Any student who misses one class will automatically receive 0% in attendance. **Any student who misses more than one class will automatically receive an F in the final grade** (unless it is a medical / family emergency, in which case a doctor’s letter and the instructor’s approval are required).

**Plagiarism is a serious offense.** Plagiarism involves stealing or passing off someone’s ideas, words, text, arts, figures, tables, homework assignments, and engineering designs as your own without crediting the source (extracted from Merriam Webster Online Dictionary). Note that the copied material can be as short as a sentence or a paragraph. If you are caught with plagiarizing someone’s materials, you will automatically receive an F in the final grade with no questions asked. **You are strongly warned that there is a zero-tolerance policy on plagiarism.**

**Assignment Submission Policy**

**Homework assignments:** Text, mathematical formulas, equations, figures and diagrams, or any scanned materials in all your homework assignments must be clearly presented and legible. Late assignments or assignments that are illegible by the instructor will not be accepted, and will receive zero score. For each homework assignment, a subset of problems will be randomly selected, and the grades for the selected problems in the assignment are based on the following categories at the grader’s discretion.

- Very good work (100%)
- Good work (70%)
- Poor work (40%)
- No work (0%)

You are strongly discouraged to copy homework assignments from one another. **Any identical or near identical copies of homework will each receive a zero score.**

All project report assignments must be submitted electronically to the FAU Blackboard SafeAssign web site (https://blackboard.fau.edu), unless otherwise stated. You are required to use your FAU account (with your assigned user name and password). All submissions will be checked for plagiarism by Blackboard. You are strongly discouraged to plagiarize, as you
will be caught to do so. You may only submit your report once, and thus you must only submit when you have your final version ready.

**Project Policy**

You must consider safety the **HIGHEST** priority when you work on any of the hands-on exercises. You **MUST** adhere to the safety precautions provided by the instructor as to how to handle mechanical and electrical parts, tools and equipment required for the project. In particular, you may not remove any tools off campus, unless approved by the instructor. You need to report any damage of any parts or tools immediately to the instructor. Any student who intentionally damages or endangers other students will automatically be removed from the class, and receive an *F* in the final grade.

**Computer Policy**

Each group will be provided a laptop computer. You may use the laptop to work on class assignments, research materials on the Internet, and prepare project presentation and report. You are not allowed to play games, listen to music, watch videos, chat online, or visit restricted web sites at all times. As files are routinely purged on the computer, you are strongly advised to bring your own blank CDs, USB memory sticks in order to back up any files that you may have created. The same computer policy is applied to those who have their personal laptops.

**Teaming Policy**

You will be divided into teams on the first day. Once every team is formed, you will work together for the entire course period. When working on the class project, each team must consist of the following members: project manager, design engineer, manufacturing engineer, and testing engineer. If there are more than four members in a team, any additional member can be either a design, manufacturing or testing engineer. Each team is required to turn in its list of team member’s names and their corresponding roles by the second day of class. As part of the project effort, each team member will be judged based on how well he/she performs his/her assigned tasks and communicates with other members in the group (refer to the teamwork rubrics):

- **Project Manager:**
  - Deal with the big picture and gets the project completed successfully (monitor project progress, anticipate unexpected delay, and revise plan accordingly)
  - Listen to other engineers’ inputs and deals with them objectively (do not bias toward some members because they are your buddies or you do not like them)
  - Facilitate discussions, disagreements, and compromise among engineers. If there are unresolved issues, the project manager must report them to the instructor
  - Provide resources to the engineers so that they are not idling or stuck
  - Participate at least in some design, manufacturing, or testing tasks. Clearly document what tasks were performed other than those mentioned above.
• **Design Engineer:**
  o Collect all the designs provided by each and every team member
  o Record the design scores according to the team members’ inputs
  o Evaluate collectively the designs based on the criteria, scores and weighting factors
  o Document the final design by choosing the one with the maximum evaluation score
  o Lead the final design in Design Review. The final design must have detailed information (dimensions, weight, location of payload, materials, etc) so that the manufacturing engineer can actually build it!
  o Receive comments during Design Review, and modify the final design if needed

• **Manufacturing Engineer:**
  o Identify what tools are needed/available, and learn how to use them (make sure that you adhere to the safety rules and regulation provided by the instructor)
  o Study the design plan and make sure that there is all the information from the design plan (talk to the design engineer if the design plan is incomplete or there is any confusion)
  o Plan out the assembly process (what should be done first, what afterward, etc)
  o Present the assembly plan to the team and receive their feedback
  o Document the assembly plan and discuss about methods, problems, challenges
  o Work with the testing engineer to determine if partial testing can be done in parallel to construction

• **Testing Engineer:**
  o Carefully study the design criteria and the operating requirements, and design a test plan for the product (a thorough test plan can test all the functionality of the product, or a bad test plan might unintentionally approves a bad product)
  o Work with the manufacturing engineer to check if the product matches the design specification
  o Present the test plan to the team, and receive their feedback
  o Document the test plan, and discuss about methods, results, conclusions
  o Carry out the testing and record visual measurements. Other team members might need to help carry out the test.
  o Work with the design and manufacturing engineers if the product fails, and re-design and re-build might be needed

**Note:** Remember your system can only be as reliable as it has been tested