MST 218 Electronic Aids to Navigation Fall 2011
Saddleback College, Division of Advanced Technology and Applied Science

1. **FACULTY INFORMATION**

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2. COURSE INFORMATION

Name and Number

MST 218 Electronic Aids to Navigation
Ticket # 16150
Meeting time and place:
OCSEC (Off Campus, Dana Point Harbor)
Class meets at OC Sailing & Events Center, 34451 Ensenada Pl, Dana Point Harbor.
August 25 to December 15, 2011; 16 weeks, 15 classes (including final exam)
No class November 24, 2011 (Thanksgiving break)
Division of Advanced Technology and Applied Science (949) 582-4541

Recommended Preparation

MST 210 Coastal Navigation, MST 214A Intermediate Sailing or equivalent experience.
(basic charting standards will be reviewed during first weeks of class)

Prerequisite or Corequisite

None

Course Description

A study of the operation and function of electronic navigational aids as they are used on board a vessel at sea. Includes GPS, autopilot, depth meter, chart plotter, and radar with hands on laboratory sessions practicing techniques for their operation. Students will be able to integrate the various instruments into a cohesive unit for safe navigation of a seagoing vessel.

Required Books

Adlard and Coles Book of Electronic Navigation (not required for first session)

Recommended Books

The Weekend Navigator: Simple Boat Navigation with GPS and Electronics
by Bob Sweet ISBN 0-07-144901-9

GPS for Mariners
by Robert Sweet ISBN 0-070141075-9

Navigation Rules
USCG document, available hardcopy, interactive online or online PDF as well as an iPhone or iPad App

Required Materials/Supplies

Study guide/workbook and chart materials will be provided as part of materials fee.
If student has a handheld GPS they should bring it to class, but Garmin 76 series GPS units will be available for checkout. Required paper plotting equipment will be discussed at first session.

Course Learning Objectives

Students will learn to operate a variety of marine electronic equipment including handheld GPS units, marine VHF radio, marine Radar, marine chart plotter with integrated GPS, use of personal computers for preplanning, uploading to marine GPs and route navigation backup. Students will explore emerging

technology that has marine navigation applications such as smart phones, net books, and iPads. Students will understand power requirements and integration of marine electronics into boat electrical systems. Emphasis will be on pre planning a cruise, documenting electronic navigation during a cruise with paper charts and logs, and safe passage with regards to the Rules of Navigation.

Student Learning Outcomes

1. Explain the operation and function of a GPS unit.
2. Demonstrate the operation of electronic instruments: GPS, chart plotter, auto pilot and radar.
3. Understand basic principals of marine electrical systems that support Electronic Navigation systems.
4. Understand how the components of an electronic navigation system can be integrated using computer technology.
6. Interface an electronic navigation system with a computer.

Methods of Evaluations

Midterm, Final, class quizzes, instructor evaluation of student performance in labs and written lab work.

Topics Covered

1. History of marine navigation.
2. Basic marine electrical systems, AC, DC, power requirements and wiring practices, galvanic and stray current corrosion, lightning protection, electrical interference.
3. Basics of radio communications, receivers (ie: GPS) vs transceivers (ie: VHF, radar transponders), FCC rules and licensing requirements.
4. Use of handheld and stand alone GPS for navigation, integrating with paper plan/plot.
5. Use of marine radar for navigation and collision avoidance.
6. Use of personal computer software to pre plan cruise and upload to GPS.
7. Integrating depth sounder into cruise navigation while underway.
8. Discussion of emerging technologies becoming available to recreational boaters such as smart phones, data tablets, FLIR, AIS.

Safety Considerations

Student safety is paramount. Electrical systems in a marine environment are inherently dangerous if not operated properly and treated with respect. This is especially true of shore power connections to boats in the water. If a student is not sure how to operate, connect or disconnect power or equipment the instructor should be advised before action is taken. Safety at sea will always be our prime objective. Any safety concern should be brought to the immediate attention of the instructor. **If it doesn't look/seem right, it probably isn't!**

The instructor reserves the right to be the final arbiter of the appropriateness and ability of any student to participate in the "at sea" portions of lab work.

3. EVALUATION AND GRADING POLICY

Assessment

Grades will be based on attendance, lab performance, quiz performance, class participation, mid term and final tests, and instructor evaluation of students demonstration of skills as follows:

Attendance	10%
Lab	15%
Quizzes	10%
Mid term exam	15%
Final exam	25%

Skills demonstration	25%
	100%

Late Assignments:
Late assignments will be accepted up to the last lab/lecture day, December 8, 2011.

4. PARTICIPATION/ATTENDANCE
Students are expected to attend class regularly. Failure to attend class is taken into consideration in the assessment for grades.
Students who fail to attend the first meeting of class for which they are officially enrolled may be dropped by the instructor unless prior arrangement has been made with the instructor (policy)
Students who officially enroll in a class and never attend will be dropped by the instructor no later than the end of the tenth instructional day of the semester. (September 2, 2011) (policy)
Instructors may drop a student from class when he/she is absent for a total of **six** cumulative instructional hours. In no case, where the instructor has the option to drop a student, should the student presume he/she has been dropped unless the instructor drop has been officially verified by the Office of Admissions and Records (Calif. Ed. Code, Section 70902)

Use of electronic devices
Please no audible cellular phones or pagers. If you must leave the classroom to answer a call or page, please leave and re-enter as unobtrusively as possible. Electronic devices required for the completion of testing will be allowed.

5. COMMUNICATION
The class will use the Saddleback email system as the backbone for out of class communication. Assignments and class information will be posted on Blackboard. Other methods of communication that may be unique to personal circumstance will be considered by the instructor but not guaranteed.

6. ACADEMIC INTEGRITY
It is expected that students will do their own work required for evaluation in this class. In general, the instructor's policy will be aligned with the policy outlined on the Saddleback College Web site.

7. DROPPING THE CLASS
It is the student's responsibility to drop the class - failure to drop the class may result in a failing grade for the course. See the Saddleback College Web site for the critical dates. The tentative dates as of the writing of this syllabus are;

Drop with Refund by:	Sunday, 9/4/2011
Elect Pass/No Pass by:	Friday, 9/23/2011
Drop without 'W' Grade by:	Friday, 9/23/2011
Drop with 'W' Grade by:	Thursday, 11/3/2011

8. STUDENTS WITH DISABILITIES
Students with disabilities are eligible for special consideration for their projects and testing. Please notify your instructor if you are disabled or have special needs so that appropriate modifications can be made to your workload and to discuss if accommodations can be made for the "at sea" portions of the labs. If accommodations can not be made, alternative training experience will be considered. Please see the Saddleback College Web site for your rights and duties as a disabled student if this section applies to your situation. Failure to officially apply in writing along with the proper documentation from a medical professional will waive any rights to special consideration. Visit Special Services in the Student Services Center, Room SSC 113 for full information.

9 CLASS CONDUCT
Students are expected to conduct themselves with respect for the right of all members of the college community to teach and learn in a safe and academically stimulating environment. Student rules responsibilities and potential disciplinary action are outlined in the Board of Trustees policy. Violation of

such rules shall constitute good cause for imposition of disciplinary action as provided by those rules and regulations (Calif. Ed. Code, Section 66300)

10. GRADE AND INSTRUCTIONAL RELATED GRIEVANCE
Official Board policy may be found on the Saddleback College Web site at
http://www.socccd.org/board/boardpolicies.asp

11. WEEKLY COURSE SCHEDULE

Session 1 August 24 -
Asses student background and skills. Lecture: a short history of marine navigation, introduction to marine electrical systems, how GPS system works.
LAB: introduction to GPS handheld devices, review of paper chart plots.

Session 2 September 1 -
Lecture: Electrical Power Requirements and Wiring Practices, Direct Current Power.
LAB: review DC electrical systems on board available boat, continue GPS handheld devices orientation and chart plotting.

Session 3 September 8 -
Lecture: Alternating Current Power, Electrical Interference.
LAB: continue GPS handheld devices orientation, land navigation exercise in harbor.

Session 4 September 15 -
Lecture: Galvanic and Stray Current Corrosion, Lightning Protection.
LAB: Pre Planning cruise using paper chart plot to upload data to handheld GPS.

Session 5 September 22 -
Lecture: Radio Waves and Transmitters, Receivers and Transceivers.
LAB: Continue handheld GPS practice, introducing PC charting software.

Session 6 September 29 -
Lecture: Antennas and Transmission Lines, Radiotelephone Operating Procedures.
Lab: Finish handheld GPS practice, review plotting procedures.

Session 7 October 6 -
LAB: Using handheld GPS to navigate at sea (BOAT LAB)
Lecture: FCC Rules and Regulations, FCC Freq. Plan, Other Communication Services.

Session 8 October 13 -
LAB: Review use of handheld GPS, review of plotting procedures.
MIDTERM - Covering all topics to date.

Session 9 October 20 -
Lecture: Introduction to Radar
LAB: Demonstrate radar operation and principles at dock.

Session 10 October 27 -
Lecture: Electronic Charting
LAB: Demonstrate dedicated on board chart plotter.

Session 11 November 3 -
Lecture: Computer-Assisted Navigation part 1
LAB: Hands on use of computer based navigation on laptops, iPhones and iPads

Session 12 November 10 -
Lecture: Computer Assisted Navigation part 2
LAB: Hands on use of all devices

Session 13 November 17 -
Lecture: Depth Sounders
LAB: Orienting bathyscaphe data with paper and electronic charts.

November 24 - NO CLASS Thanksgiving break.

Session 14 December 1 -
Possibly replaced by day field trip LAB on Saturday December 3 or Sunday December 4

Session 15 December 8 - Review of integration of systems

December 15 - Final Exam

12 FINAL EXAM:
Per Board policy, a final examination of at least two hours will be given in all courses. Policies regarding early finals or missed finals will be according to Board policy. Legitimate reasons for missing a final exam should be communicated to the instructor so a grade of "I" (incomplete) can be assigned.

13 ACKNOWLEDGEMENT OF RECEIPT OF SYLLABUS:
Signing in on the student attendance sheet shall constitute that the student has read and understands the policies outlined in this syllabus along with any elaboration provided by the instructor. The student agrees to adhere to the policies and procedures outlined. The instructor reserves the right to change the policies, procedures and course schedule to align with the needs of the students and the vagaries of the weather to insure a safe operation at all times.