Coastal Navigation (ASA 105)

Prerequisites: None

General Description: Able to demonstrate the navigational theory required to safely navigate a sailing vessel in coastal or inland waters. There is no Sailing Skills part to this Standard and practical application of this Sailing Knowledge is found in the Advanced Coastal Cruising Standard.

SAILING KNOWLEDGE

A Certified Sailor has successfully demonstrated his or her ability to:

1. Explain the chart symbols and conventions on U.S. nautical charts in accordance with the terminology of Chart #1.

2. Identify a source of official U.S. Coast Guard navigation publications.

3. List the publications required for prudent navigation in the local area including the following ASA minimum requirements:
   - Large scale charts of the area and Chart #1
   - Federal Requirements for Recreational Boats
   - USCG Navigation Rules
   - State small vessel regulations
   - Local rules and regulations, if applicable
   - Local Cruising Guides
   - Tide and current tables, (paper or electronic)
   - List of lights, buoys, and fog signals

4. List the instruments required for prudent navigation in the local area including the following minimum requirements:
5. Describe the purpose of "Notice to Mariners."

6. Use the tide and current tables to find:
   o Times and heights of tides at reference and secondary ports.
   o Direction and rate of current at referenced and secondary stations.

7. Convert courses and bearings between true, magnetic, and compass.

8. Check compass deviation by means such as a transit bearing.

9. Plot a dead reckoning position on a chart using speed, time and course to steer.

10. Allow for the effect of current and leeway to plot the estimated position.

11. Determine a course to steer which takes into account known current and leeway.

12. Determine current given the course steered and speed and two observed positions.

13. Plot a chart position from terrestrial objects using:
   o Two or more bearings on different objects taken at one time.
   o Bearings at different times (i.e. a running fix).
14. Use the above techniques to chart a course of at least 20 miles and 3 course changes.

15. Explain the terms and characteristics used for lighted navigation aids.

16. Explain the significance of shapes, colors, and lights used in the buoyage system.

Due to the breadth of material to cover and skills to master, this course requires approximately ten hours of home study prior to arrival for the class. By reading some text and doing a number of practice problems, you will become better grounded to make the most of your time at Bay Breeze.

The following is the minimum home study. Feel free to read and do practice problems beyond this outline. Leaf through the chapters and appendices to get a feel for the scope of coastal navigation. Read the Introduction for an overview of Captain Pyzel’s approach to learning coastal navigation. The Coastal Navigation (ASA105) CD by Captain Lisa Batchelor Frailey is an excellent aid to support your understanding of the knowledge, concepts and skills presented in the text. ASA’s website also has good information to assist your study: www.american-sailing.com/cnp.html.

Questions or Comments? Email Capt. Dave Williams - williamsda@chartermi.net

Materials needed:

Included:
1. Coastal Navigation & Piloting textbook (by Captain Mike Pyzel)
2. Coastal Navigation & Piloting DVD
3. Chart 1210Tr
   a. Please keep this chart in good shape as you will be using it during the course and for your final test.
4. Practice Plotting Sheets – use as many as you like for practice navigation problems. Photocopy more sheets from a master if needed.

Not included:
1. Parallel rules and dividers are required for plotting but are not included with this course. We recommend Weems & Plath® dividers and parallel rules which can be purchased online or in store at any West Marine.
   a. Dividers: Weems & Plath® Ultralight Dividers/Compass 7” @ $19.99 West Marine Retail (W.M. Model 5491428 WEEMS #176)
   b. Parallels: Weems & Plath” 15” @ $12.99 West Marine Retail (W.M. Model 6723464 WEEMS#99W)
2. Calculator, pencil and eraser

Page numbers are prefixed by their chapter numbers. For example, page 7-4 is the fourth page in Chapter Seven, “Fog Navigation.” Appendix E includes all the practice problems. Appendix F provides answers to allow for self-checking the practice problems. The last page illustrates the U.S. Aids to Navigation System.

Chapters 1 & 2  • Have the 1210Tr chart open and refer to both sides of it while reading these two chapters.

“Navigation, Piloting and Charts” (1) Measuring direction and distance; The compass rose

“Reading Nautical Charts” (2) Chart Symbols; Buoys, beacons and lights; Soundings; Danger symbols; Light sequences
   • Reading: Pages 1-1 through 1-7 and pages 2-1 through 2-10 (plus, note the last page of the book)
   • Practice Problems: 1 through 10 on pages E 2 & 3

Chapter 3 “Dead Reckoning Navigation” Measuring and plotting direction and distance; Speed-time-distance calculation; The safety valve; Tacking upwind and in heavy weather

Chapters 3 and 4 deal with how a navigator can determine the vessel’s position on a body of water. In this chapter the instruments, tools and methods to determine a DR position based on course, speed, distance and time are explained.

• Reading: Pages 3-1 to 3-9

• Practice Problems: 1 through 5 on pages E 4 & 5.
Chapter 4 “Bearings and Fixes” Hand bearing compasses; Plotting bearings; Use of soundings; Dipping a light; Estimated position; Bow and beam bearings; Relative bearings

This chapter adds to your dead reckoning skills by using magnetic bearings taken on landmarks, depth soundings, transits (aka ranges), relative bearings, and distances off (for circular LOP’s) to determine lines of position (LOP), fixes and estimated positions to more accurately determine your position on the water.

- Reading: Pages 4-1 to 4-14
- Practice Problems: 1 through 5 on pages E 6 & 7

Position Fixes & Other Problems from Chapter 4

These problems illustrate a variety of methods to determine your position on the water. Do your work on the practice plotting sheets available online as a pdf document from ASA. Google American Sailing Association. Click on the sailing resources tab at the top right in the menu bar. Click on the Coastal Nav. & Piloting Course at the bottom of the page. Find the Coastal Navigation and Piloting Plotting Sheet and click the link to get a printable pdf document. You will need a minimum of eight sheets. As you work, remember LOP means Line of Position. Practice diligently on your plotting accuracy—you may want a magnifier. Remember All work is in magnetic degrees: USE THE INNER CIRCLE ON THE CHART COMPASS ROSE.

1. Fix: 2 LOP from two transits (aka ranges) As you are sailing you notice the following two visual range alignments: Point C aligns with point A, and point D aligns with point B. What is your position?
   Latitude_______________________ Longitude_______________________

2. Fix: 2 LOP from visual bearings You are sailing on a course of 150º M and use a hand bearing compass to take a bearing of 011º on point B and another of 318º on Point A. What is your position?
   Latitude_______________________ Longitude_______________________

3. Fix: 3 LOP from visual bearings A moment later you take a third bearing of 281º on Point C.
   Latitude_______________________ Longitude_______________________

4. Fix: 2 Circular LOP from radar You are east of the point of land and, using radar, you measure the distance to point F at 4.0 NM and to point E at 4.5 NM. What is your position?
   Latitude_______________________ Longitude_______________________
5. **Fix: 1 Circular radar LOP & 1 visual bearing LOP** A little later you measure the distance by radar to point C at 3.0 NM and the bearing by hand bearing compass to point C at 174º. What is your position?
   Latitude ________________________  Longitude ________________________

6. **Fix: 1 visual bearing LOP & 1 depth sounding** A mile or so southeast of point C you notice that the sounder indicates a depth of 12 feet. At the same time the hand bearing compass gives bearing of 019º on point C. What is your position? Latitude ________________________  Longitude ________________________

7. **Running Fix: 2 visual bearing LOP taken at different times on the same light** At 0800 you depart point E on a course of 052ºM at 5.2 knots. At 0830 you take a visual bearing of 095º M on light F. At 0915 you take a second bearing of 176ºM on this light. What is your 0915 position?
   Latitude ________________________  Longitude ________________________

8. **Estimated Position (EP): 1 LOP from a visual bearing & 1 DR** At 0900 you depart point F and set a course of 276º M at 5.0 knots. At 1000 the hand-bearing compass gives you a bearing of 238º on point E. What is your 1000 estimated position?
   Latitude ________________________  Longitude ________________________

9. **Relative Bearing** You do not need to plot this problem. While on a course of 137º psc (per ship’s compass) you sight a buoy bearing 30º off your starboard bow. What is the bearing to this buoy? _____º psc
   See page 4-7 for an explanation of relative bearings.

10. **Distance off by doubling the angle on the bow** You do not need to plot this problem. You are sailing at 6 knots and observe a point of land at 45º off your starboard bow. A half hour later you note that this point is 90º off your starboard bow. How far away is it? ___________ See pages 4-6 & 7 for help and illustrations.

11. **Danger Bearing** See pages 4-8 through 4-10 for an explanation and illustrations. You are located at 25º58.5’N and 75º06.0’W and sailing NNW on a starboard tack when you observe the point of land close off your starboard bow. To ensure safe passage off this lee shore, you check the chart and decide to use the lighthouse at point A to establish a danger bearing. From your present position, what is that bearing? As you proceed, should you keep the bearing on point A greater or less than the danger bearing?
   Danger Bearing on Point A is ________º M  Keep bearing on point A greater (“not less than”) or less (“not more than”) than the danger bearing?

**Questions? Comments? Email Capt. Dave Williams at: williamsda@chartermi.net**