AS-103 Basic Coastal Cruising certification instructor guide

This document is a guide to teaching Basic Coastal Cruising AS-103 at Spinnaker Sailing. Instructors should consider what follows as advice on how to teach this class as they develop their own means and style.

The class outline pages suggest what to present and how for Zoom classroom sessions and for on-board lessons, with peripherals the instructor can use to illustrate lessons.

Peripherals include the Basic Coastal Cruising Study Guide also referred to as the Basic Coastal Cruising (BCC) Handout, and the Crew Overboard Under Sail document, both of which can be shared on-screen with students.

Advice directed to instructors is given in [brackets].

By the end of the course, students should have knowledge of the following:

- Required and recommended safety equipment and their use.
- Basics of navigation, including basic chart symbols, soundings, bottom types, hazards, aids to navigation, latitude and longitude, magnetic direction, measuring distance.
- The dangers of a lee shore.
- Basic weather safety and how to obtain weather information.
- Sail combinations, reefing, heaving to.
- Rules of the road.
- How to handle basic emergencies.
- How to anchor.
- The eight knots required for this level.

Note that very little *new* is required of students in terms of sailing skills. Instead, students are expected to master the various skills they were introduced to during AS-101. The new material in this course is essentially about learning to sail safely without the aid of an instructor.

If the instructor wishes, pages of a digital version of the “Coastal Cruising Made Easy” textbook can be shared with students during Zoom classroom sessions. Here are links to purchase digital versions…

- **Apple Books:**
  https://books.apple.com/us/book/coastal-cruising-made-easy/id1088937695
- **Google Play**:
  https://play.google.com/store/books/details/Coastal_Cruising_Made_Easy_The_Official_Manual_For?id=CJSEDwAAQBAJ&hl=en-US

Refer to the document Certification-ASA-103-Standards.pdf for complete information on what students are required to know to pass AS-103.

Refer to the Zoom presentation guide for tips on how to run a Spinnaker class on Zoom.

Zoom Classroom — Day 1

Introductions — 5 min

Advice to Instructors:

- Introduce yourself and briefly share your sailing background.
- Ask students to briefly share their names, sailing experiences, and goals in taking the class.

Objectives / Lesson materials / Lesson routine — 5 min

- This is a four-day class during which students will advance their sailing knowledge and skills to enable them to be a safe and responsible independent skipper aboard Spinnaker's 24-foot to 28-foot boats. Much of what in this course relates to safety since skipper's primary responsibility is the safety of the vessel and everyone on board.
- Classes will follow the lesson plan in the Basic Coastal Cruising study guide that Spinnaker Sailing has developed.
- "Classroom" sessions of up to about two hours long will be held via Zoom the first three mornings of class; On all four days, on-the-water sessions of about four hours each will be onboard a boat in the afternoons.
- To pass, students will need to accomplish three things:
    - Pass a written (multiple choice) test on everything presented during the "classroom" sessions of this class. Students can take that test the morning of the fourth day in the Spinnaker office or at any other time they arrange with the Spinnaker office. The test consists of 100 multiple-choice questions.
    - Satisfy the on-the-water instructor that the student has mastered skills expected at this level.
    - Demonstrate that the student can tie the eight knots that are required at this level. These include the six from AS-101 (reef knot, clove hitch, cleat hitch, round turn and tow half hitches, bowline and figure-8 knot) plus the rolling hitch and sheet bend.

Tides and tidal currents — 30 min.

[Share screen of tide app from phone or pad]

- **Tides**: The vertical change of the water level. The typical tide range in San Francisco Bay (from highest high to lowest low) can vary from about 6 feet to as much as 11 feet.
- **Currents**: The water goes up and down because a tremendous amount of water flows in and out of the Golden Gate twice a day. That flow is called current. In the bay near Spinnaker Sailing, currents reach a maximum of around 3 knots.
- Think about what that means…
  [Share South Bay chart. Instructor can use this as a prompt to explain how depth is denoted on charts and the idea of Mean Lower Low Water, latitude and longitude, how distance is measured in nautical miles, and the relation to latitude.]
    - Many areas in the South Bay are too shallow to sail in and the mariner will go aground at low tides.

        - At top speed going with the fastest tidal current, A sailor could be moving about 9 knots, which is great. But at top speed going against the fastest tidal current, the boat may be only moving about 3 knots. Due to tidal action, one might go three times faster with the current as against it!
    - Tide apps can give the mariner detailed images of tides and currents in any given area where they plan to sail.
    - Tide books are also available to give times of high tide, low tide, maximum flood (incoming current), maximum ebb (outflowing current) and slack tide at the Golden Gate. Those times and heights must be interpolated for wherever the mariner is on the bay. [Show students a tide book]
    - At Spinnaker Sailing, high tide occurs about an hour later than at the Golden Gate and is 2.2 feet *higher* than at the Golden Gate. Low tide at Spinnaker Sailing occurs 1.5 hours after the low at the Golden Gate and is 0.1 feet higher than at the Golden Gate.
    - Tide tips:
      [share chart of the South Bay]
        - Current is stronger in deeper water.
        - Current going against prevailing wind can create steep chop and wind waves.
        - At change of tide, the new flow direction begins closer to the shore well before the directional change in the middle of a deeper channel.

Aids to Navigation and regulatory marks — 15 min
[Share AtoN page from Study Guide, and instructional photos of AtoNs and marks.]
- Lateral marks.
- Preferred channel/junction buoy.
- Safe water/mid-channel/Approach buoy.
- Diamond-for-danger mark.
- Circle-for-speed limit mark.
- Diamond with cross mark denoting an exclusion zone, usually for a swim area.

Sound and flag signals — 5 min
- One short blast (2 seconds): I would like to pass you on my port side. (Or, on the ocean, I'm turning to starboard.)
- Two short blasts: I would like to pass you on my starboard side.
- Affirmative response: Repeat the same signal.
- In fog or in narrow waterways with obstructed vision: One long blast (5 seconds) every two minutes. Or, if under sail, One long blast followed by two short blasts.
- Three short blasts: I am operating astern propulsion.
- Diver-down and swimmer in water flags.
  [share images of flags.]

{five-minute break}

Anchoring — 30 min

[Share Study Guide pages on anchoring]

- Scope — the ratio of length of anchor rode to water depth + height of deck from water
  - A scope of 7 to 1 is considered sufficient to anchor safely. If anchoring in 10 feet of water, one would add 3 feet to account for the height of the foredeck off the water and multiply the result, 13 feet, by 7 to get a scope of 91 feet of anchor rode.
  - For temporary anchorages or when the bottom offers very secure holding, less scope may be considered reasonable.
- Selecting an anchorage — four keys to a safe anchorage
  - Shelter — A good anchorage is sheltered from wind, waves, current and vessel traffic.
  - Bottom — The sea bottom of a good anchorage is compatible with the anchor being used.
  - Depth — A good anchorage has sufficient depth so a vessel won't ground, but not be too deep for sufficient anchor rode. Note that the mariner must calculate scope based on the deepest tide expected.
  - Swing room — A good anchorage will allow the boat to swing around the fixed anchor without hitting bottom, other boats or any obstructions.
- Procedures
  - Find a good spot and maneuver the boat into the wind (or current) under motor and stop forward motion.
  - Ensure bitter end of rode is attached to the boat. Then lower anchor to bottom. (Don't drop anchor and rode in a bunch.)
  - Pay out appropriate scope and as the boat backs down either under power or pushed by wind.
  - Snub anchor — gently at first — using the engine.
  - Make sure anchor is set by taking a range or ranges to ensure vessel is not dragging.

Review Figure-8 COB process — 10 min

[Share appropriate pages from the Study Guide or from the Crew Overboard guide]

Figure 8 maneuver in 12 (or so) steps when someone goes overboard…

1. Alert: Someone yells "Crew Overboard."
2. Someone throws (pantomimes throwing in practice situations) flotation toward the COB to help keep COB visible to vessel crew.
3. Skipper assigns a spotter to keep eyes on and point to COB.
4. Skipper puts boat on a beam reach or slightly above and sails about five boatlengths.
5. Skipper quickly tacks to a broad reach (crossing wake of the former course).
6. When COB is nearly abeam of bow, skipper quickly turns boat toward COB without trimming main sail to verify main can luff.
7. If main sail can luff, the main is trimmed to slow sail toward COB, with the boat aiming slightly to windward of the COB.
8. Several boatlengths, from COB, the mainsheet is released.

9. As the bow passes COB the skipper turns the boat slightly to windward (without tacking!) to help slow boat and to move stern toward COB.
10. The vessel stops abeam of and to windward of the COB.

Taking out / Chartering Spinnaker boats — 5 min

[Share check-out pages on Spinnaker web site's members area]

- Spinnaker club members who have passed AS-103 can charter certain Spinnaker boats.
- Part of that process is completing check-out and check-in forms that are available for members on the Spinnaker web site.

On the Water — Day 1

At the dock — 45-60 min

[On a smart phone or pad, call up the check-out page for the vessel you're on. Hand it to a student and have them read each item. As each item is read, find that item on the boat, explain what the mariner needs to know about it.]

- In cabin/on deck at dock
  - 9 required items
    - Visual distress signal device.
    - Audible signal device.
    - Wearable pfd for each person aboard.
    - Throwable pfd.
    - Type B fire extinguishers.
    - Running lights.
    - Vessel registration.
    - Disposal at sea placard.
    - Fuel spill placard.
  - Recommended items (chart, water, anchor, phone with emergency numbers, appropriate clothing, sunscreen, etc.).
  - Use of VHF — including Pan Pan, Securité, Mayday calls, use of mic push-to-talk, Channel 16 as emergency frequency, channels 68, 69, 72 as conversation channels, continuous weather channels.
  - Rigging the emergency tiller.

Engine — 15 min

- Show engine controls, wheel, switches and gauges.
- Demonstrate starting engine
  - Electricity selector switch to even or odd as appropriate for date.
  - Engine switch on.
  - Throttle to just above idle.
  - Glow plug pressed for 30 seconds.
  - Push and hold starter button. If engine doesn't start quickly, use more glow plug.
  - Ease throttle to idle after engine starts.
  - Check for flow of water from exhaust.
    - Discuss water flow in exhaust — use this as entry to discuss diesel engine cooling system. If there's no water, or there's steam in exhaust, raw-water half of cooling system is faulty.
- Demonstrate transmission shifting at idle speed.
  - In forward gear, note motion of water astern.
  - Note motion of water with engine in reverse, note the existence of prop walk.
    - No apparent water motion to port.
    - Much water motion to starboard.

Leave dock for first time, demonstrate pump-out process — 15 min

- Coach students in roles.
    - Foredeck, stern line.
- Coach student at helm through steps to leave dock.
    - Ask if crew is ready to cast off.
    - Command to cast off.
    - Engine in forward gear, boat headed straight out of slip until stern is clear of finger.
- Coach student at helm to turn left after leaving fairway.
- Coach helm and crew to dock starboard side to (as appropriate) at pump-out station.
- Demonstrate pump-out process.
    - Mention that charterers must pump out if head was used during charter or pay a fine.

Motoring practice (on way to anchoring practice) — 15 min

- Practice proper use of transmission forward/neutral/reverse. Pause in neutral for a beat when switching from forward to reverse.
- Engine speed.
- Wheel use.

Anchor in channel across from Stanford boathouse — 20 min

- Discuss anchoring process on way to anchorage.
    - Point out Mark 21 and to never pass landward of it.
- Assign crew: foredeck, helm.
- Coach crew through anchoring process. Use steps from classroom session.
- Once anchored, demonstrate ranging to ensure anchor is holding.

Raising anchor and getting under way — 10 min

- Assign new helm, anchor person and a crew member on foredeck to indicate to the helm the direction of the anchor.
- Motor slowly toward anchor while anchor person hauls in rode.
- Stop when nearing anchor.
- Anchor person calls “Up and down” when anchor rode is vertical.
- Anchor person attempts to get as much mud as possible off anchor before heaving anchor aboard and stowing.
- Helm takes control of vessel and motors toward main channel.

Sail practice — 30-45 min

- Raise main and practice sailing, coming up, bearing away, tacks.
- Unfurl jib and continue with each student taking turn at each position.
- Furl jib, drop and tie off main.
- Deploy fenders.
- Deploy dock lines if they were removed earlier.

Docking practice — 30 min

- Assign helm and dock line handlers.
- Coach students to dock bow first under power.
- Coach students to back out of slip, rotate crew positions and repeat until 15 minutes before end of class time.

Put boat away — 15 min

- Mainsail properly flaked, mainsail cover on.
- Dock lines properly deployed.
- Power cable in place and switched on.
- Power off at vessel electrical panel.
- Backstay tensioner loose.
- Note any items to be included on check-in form.

Advice to instructor: *Spend some time, up to 15 minutes, at the "hitching post" outside Spinnaker classroom each day working on the required knots. Can do this before or after on-board lesson until each student meets the standard.*

Knots — Students must know how to tie and describe the purpose of eight…

- Figure 8 | Cleat hitch | Square (reef) knot | Bowline | Clove hitch | Sheet bend | Round turn and two half hitches | Rolling hitch.

Zoom Classroom — Day 2

Intro to charts — 10 min

[Share chart of South Bay]

- Depths…
  - Are at Mean Lower Low Water (MLLW) on U.S. charts.
  - May be in feet, meters or fathoms. Refer to the chart's title block for traditional charts or at lower right corner for modern U.S. charts.
- Distance in nautical miles. One minute of latitude is one nautical mile. [Indicate latitude scale on chart.]
- Aids to Navigation — lateral channel marks, preferred channel (junction) marks.
- Compass rose, with two circles — outer for true directions, inner for magnetic directions.
- Radio towers.

Cruise planning — 30 min

As an exercise in this class, we plan a trip from Spinnaker Sailing to the San Mateo Bridge and back and then make that trip.

[Share South Bay chart]

- Measure distance by water using chart and dividers.
  - A video on using dividers to measure distance on a chart: https://www.youtube.com/watch?v=acjLdnOmg
  - A video on using parallel rules to measure direction on a chart: https://youtu.be/A5WmKHvLwFE?t=94
- Estimate your boat's speed through water.
  - Hull speed in knots (nautical miles per hour) roughly equals 1.3 x sqrt(length of boat at waterline in feet). A boat with a 25-foot waterline would have a hull speed of 1.3 x 5 = 6.5 knots
- Estimate your boat's VMG to upwind goal
  - For trigonometry buffs, VMG = speed through water x cos(wind angle). For the rest of us, VMG is a bit more than half the boat's speed through the water, assuming steering and tacking are excellent.
- Check tides/currents for planned cruising times. Use current calculation to adjust speed through water to estimated **speed over ground** for each leg..
- Estimate time to reach destination by multiplying distance to travel and speed over ground for each leg and then add times for each leg together.
- Note: Tides and currents tend to be opposite one week later. For example, if it's a maximum flood at noon on a Saturday, you're likely to have a maximum ebb about the same time the following Saturday. It's often a good idea to select a day in the course when you have more ebb than flood for the trip to the San Mateo Bridge.
- Keep in mind…
  - Wind direction
  - Leave room in calculation for unexpected delays

Practical note: In typical wind conditions, its' about 8 nautical miles upwind through the water from Spinnaker Sailing to the San Mateo Bridge, and about 6 nautical miles downwind back.

Weather — 5 min
[Share instructional photos]

- Wind builds in the afternoon in warmer months.
- Wind during spring, summer and fall comes generally from the northwest, but can vary.
- Fog (advection) over hills usually suggests stronger winds.
  [Share photo of clouds coming over hills west of Redwood City.]
- Avoid dust devils.
    - Falling barometric pressure suggests bad weather is approaching.
- Cumulonimbus clouds, though rare in California, suggest dangerous heavy weather.
  [Share photo of cumulonimbus cloud.]
- Small craft advisories are issued when winds are forecast to be above 20 knots but not more than 33 knots. Gale warnings are issued when winds are forecast to be 34 knots or above.
  [Share photos of one and two red pennants indicating small craft advisories and gale warnings.]

- What to do in fog
    - Take compass bearings to known reference points.
    - Navigation lights on.
    - Hoist radar reflector.
    - Slow to safe speed.
    - Sound signals - 1 prolonged blast every 2 minutes or 1 prolonged and 2 short blasts every two minutes if sailing w/out motor.

Navigational lights — 5 min
[Share nav lights page from Study Guide]

- Three lights required for sailing vessels.
- Four lights required for motor vessels.
- Sidelights visible from dead ahead to 22.5° aft the beam.
- Stern light visible astern from 22.5° aft the beam on one side to 22.5° aft the beam on the other side.
- Motoring light visible above sidelights from 22.5° aft the beam on one side to 22.5° aft the beam on the other side.

{5-minute break}

Dealing with Emergencies — 60 min
Contacts

- Spinnaker Sailing boats all have an laminated orange emergency contacts card on board. It has contact information for Spinnaker and the Coast Guard by phone and by VHS.

Safety harness
[If you have a safety harness, show it to students on the screen]

- The purpose is the keep a mariner attached to the boat in potentially dangerous situations.
- The harness, tethers and jacklines work as a system.

Flares

[Have a flare available to show on screen]

- Demonstrate how to light — take off red cap to expose flare head, take black cap off red cap to expose striker, strike to light.
- Hold horizontal over water as hot wax will drip.
- Only light when potential rescuer is visible.
- Flame is visible in broad daylight for two miles.
- Flame burns for two minutes.

Fire

- Three types: Type A burns solid fuel; Type B burns liquid fuel like gasoline; Type C is an electrical fire.
- Water will put out only Type A fires. Other fires require other extinguishing methods.
- Vessels are required to at least carry extinguishers that will put out Type B fires. On vessels used in AS-103, at least two approved hand-held extinguishers are required. (Note that the AS-103 test uses terminology that is out of date — B-I for small extinguishers and B-II for larger ones. The current terms are 5-B and 20-B for those extinguishers.)

Hypothermia

- Assuming a PFD is being worn, the greatest danger for the person in the water is hypothermia. The bay is about 55° Fahrenheit or less.
- A person in water that temperature quickly begins to lose muscle control. The best position for him/her to be in is a fairly tight fetal position to preserve heat — the so-called HELP position for Heat Elimination Lessening Posture. Swimming and exertion don't help!
- Symptoms of hypothermia:
    - **Mild**: Slurred speech and violent shivering.
    - **Moderate**: Loss of muscle control, incoherence, drowsiness, exhaustion.
    - **Serious**: Unconsciousness, possible respiratory distress and possible cardiac arrest.
- Treating a potentially hypothermic person
    - Remove wet clothing.
    - Wrap in a warm blanket with a healthy shipmate.
    - Offer warm (not hot) fluid.
    - NO massaging!
    - NO alcohol!
    - NO caffeine!
- If someone goes into the water
    - Rescue victim.
    - Treat for hyperthermia.

- Contact Spinnaker Sailing base and 911 and/or Coast Guard.
  - Spinnaker is 650-363-1390
  - Coast Guard emergency is 415-399-3300

Rig failure

[Use a boat model, if available, to demonstrate]

- Steer boat to put failing stay downwind. Takes strain off the stay.
- Rig some kind of support using a spare halyard.

Steering failure

- Rig the emergency tiller.

Fouled propeller

- Immediately stop propeller rotation by switching to neutral.
- Try to pull line off propeller. Can rotate prop shaft by hand from inside boat.
- Prevent by ensuring no lines are overboard, particularly while docking or leaving dock.

Broken halyard

- Use a spare halyard to rehoist sail.
- Drop sail completely and use engine if necessary.

Running aground

- Try to steer bow toward open water.
- If on a windward shore, backwind jib.
- On a leeward shore, drop all sails.
- Use crew weight to tilt boat without rocking.
- Try to motor off.
- If unsuccessful and on a windward shore, wait for higher tide.
- If unsuccessful and on a leeward shore, cast an anchor and wait for a higher tide.

Flooding

- Ensure bilge pump(s) operation.
- Find source of leak.
  - Possible sources: any through hulls (sink, head, engine cooling), propeller shaft packing gland.
- If it's a large leak, plug if possible.
- Maneuver boat to shallow water.
- Call for help.

Docking without a motor

- If main is up, sail under main alone to side tie at Spinnaker docks.
- If main is down, use jib alone to dock downwind at Spinnaker docks.

Explosions

- Four possible sources:
    - Hydrogen created while battery is charging.
    - Methane from head holding tank.
    - Engine fuel, particularly gasoline.
    - Stove fuel, particularly propane, which is heavier than air.

Refueling

If necessary, pull into a fuel dock and…

- Estimate how much fuel will be needed.
- Non-essential crew off boat.
- Engine and electric off.
- Ensure no sources of ignition such as someone smoking in area.
- Note where fire extinguishers are located.
- Close up boat.
- Ground nozzle to fuel port in case of static electricity.
- Fuel carefully, watching pump gauge and listening for sound of fuel entering tank to ensure you don't over-fill and create a spill.
- After fueling, wipe up any spills, ventilate boat, smell for fumes.

On the Water — Day 2, 3, 4

On day chosen to visit the San Mateo Bridge, leave the dock as quickly as possible. Point out…

- The lateral marks that denote the Redwood Creek Channel, noting that the posts of the marks are actually in shallow water. Stay at least a boatlength into the channel.
- How the two radio towers on shore line up exactly in line with Mark 2. Mariners can use this to ensure they recognize where Mark 2 is.
- Mark 12. Note the straight line from Mark 2 through Mark 12 to the end of the fishing pier at the San Mateo Bridge is the southwest edge of the navigable portion of the South Bay.
- Mark 11 just south of the bridge is a hazard if mariners aren't aware of it.
- Motor running before attempting to pass north under bridge.
- Mark 10 just north of the bridge.
- The safe course back toward the Redwood Creek Channel is toward the EAST end of the Dumbarton Bridge, or 110° magnetic.
- Racing marks if you should sail near them.

While sailing back from San Mateo Bridge is a good time to demonstrate use of whisker pole and jibe preventer.

On all other on-the-water days, practice sailing and docking…

- Hold steady course for two minutes.
- Come up, bear away, with crew trimming sails as appropriate.
- Tacks, jibes.
- Crew overboard drill — Figure-8 COB recovery procedure.
- Practice bow-first docking and backing out under motor. Discuss bow line, stern line and spring lines while docking.

- Please **don't** have students back the boat into slip or spend time on standing turns or other motoring skills. Those are best left to the docking and maneuvering class.

Zoom Classroom — Day 3

Go over the review questions for Basic Coastal Cruising. Note that students may not have come across all the topics in the review questions. Use this opportunity to briefly cover those topics. Among these might be…

- Isobars as weather map indicators of strong winds when close together.
  [share the National Weather Service Ocean Prediction Center page for the North Pacific: https://ocean.weather.gov/Pac_tab.php
- Towing: Suggest a bridge with a loop attached to both stern cleats or both winches of towing boat. Bow line of boat being towed secured to loop with a bowline knot. Leave enough distance between the two boats.

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