

## BCU Coastal Navigation and Tidal Planning Trainers notes

### Course Philosophy

This course is designed for those paddlers carrying out coastal journeys including islands up to 2 nautical miles offshore in areas of tidal movement up to 2 knots and winds of up to force 4 and is suitable for those seeking their 4 star award sea. This course is designed to complement the areas covered in the 4 star leader training.

### Course Aims

The aim of this course is to give the student the tools to enable them to plan and navigate effectively on coastal journeys in moderate sea conditions. This will include the following aspects:

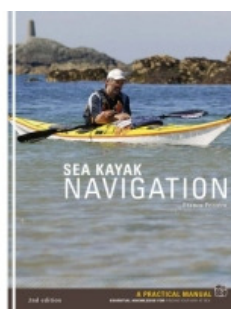
- To interpret sources of information including maps, charts, coastal pilots and tide tables
- To navigate on the water using visual references and simple pilotage techniques e.g. transits, dead reckoning and a compass
- To be able to source, interpret and apply a weather forecast to the marine environment
- By the end of the course each student should have planned at least 2 coastal journeys that they can take home as references for further trip planning
- Students should also be aware of the range of resources they require to plan trips in the coastal environment
- Although not part of the syllabus of the course, students should be made aware of the role of the Coastguard and the value of liaising with them

### Equipment required for course by students ([pre-course letter info](#))

- Prescribed map of a given area (for trip planning exercise) – could be included in course fee or directed by the tutor
- Silva type 4 or similar compass suitable for map work
- 2B pencils & rubber
- Notebook

### Recommended Reading

Sea Kayak Navigation, 2<sup>nd</sup> Edition  
By Franco Ferrero  
ISBN 978-1-906095-03-1



### **Equipment provided by tutor and required for effective Coastal journey planning**

It is expected that students will work in pairs and that the following equipment would be available between two;

- Breton plotter
- Parallel rules
- Dividers
- 2B Pencils
- Pilots / Sailing Directions / sea kayak guides e.g. Oilean.
- Charts
- Maps
- Tide tables (Local relevant to pilot and charts)
- Other types of compass

### **Venue & Duration**

- This is a theory-based course and will take place in a suitable indoor teaching venue with worktables / chairs
- Access to presentation resources for PowerPoint or OHP will be required
- The course is of 8 hrs duration (1 day or several modules)

### **Administration**

- A **Course Authorisation** number is required - obtained from Home Nation Association
- At the end of the course the course director should sign the students logbook if requested
- A **Course Schedule** must be returned to the Home Nation Coaching Officer, within 7 days of the course, with the relevant certification fees. A course schedule is provided by the Home Nation Coaching Office, at the time of notification of the Course Authorisation Number. As a result candidates will receive a Certificate as evidence of training completed
- The **Certification Fees** are £5 for BCU Members, £10 for non-members

### **Training Notes**

Whilst this is a theory-based course the intention is that it is highly practical and not a lectured syllabus. The students should participate in a variety of practical planning exercises using the variety of resources provided. This must constitute a minimum of 50% of the course time.

### **Timings**

- Weather - 1 hour
- Tides - 2 hours
- Maps and charts - 1.5 hours
- Planning exercises - 2 hours

The above are approximate timings and depend on the needs of the students.

## Staffing & Ratios

Ratio 1:8 Registered BCU Coastal Navigation and Tidal Planning Tutor

Ratio 1:12 As above plus BCU Level 3 Sea Kayak Coach

(12 is seen as a working maximum on this course – due to course constraints re practical chart work exercises)

## Course content

### 1. Environmental considerations (Max time of 2 hours teaching)

#### Weather

On completion of this module students should have an awareness of the formation of weather, rather than an understanding, and a practical understanding of sourcing and interpreting a weather forecast to the area they are planning their trip planning exercise in.

*This session should include practical exercises in interpreting weather information, including live weather forecasts if internet connection is available.*

*See Appendix Exercise 1 for example.*

- Cause and effect of atmospheric circulation, this should include;
  - Understanding of the development of weather systems and fronts
- Cause and effect of weather systems including frontal development & effects, this should include from a synoptic chart;
  - Recognition of anti-cyclones and associated weather and wind conditions
  - Recognition of depressions and associated weather and wind conditions
  - Recognition of warm, cold, and occluded fronts and their associated weather
  - It would be important to understand and be familiar with the use of a hand held or watch based barometer, the use of a barometer should also be tied into a barometric chart
- Sea conditions associated with weather;
  - Awareness of Beaufort scale and understanding of associated sea conditions
  - Awareness of effect of systems offshore in the development of swell
  - Awareness of the effect of reefs / shallows in the creation of breaks / boomers
  - Awareness of the effect of cliffs, valleys etc. in creating wind shifts and funnelling effect
  - Awareness of katabatic winds (sea and land breezes)
  - Awareness of causes and effect of fog

- Where and when to obtain a sea area or inshore waters forecast and how interpret it;
  - Radio 4 LW times / RTE times
  - Internet
  - Local Radio information
  - VHF via Maritime Coast Authority (MCA)
  - Awareness of terms used particularly with respect to time and change e.g. Imminent, soon, etc
  - Importance of obtaining updates to forecasts due to changes
- Working knowledge of the shipping forecast, this should include;
  - Terms used for movement of pressure systems.
  - Terms used for Pressure tendency in station reports
  - Terms used for Gale Warnings
  - Terms used for Timing of Gales
  - Terms used for Visibility
  - Terms used for Wind
  - Awareness of relevant sea areas including those that would provide information on following weather
- Other sources of weather forecasts;
  - Obtaining TV, Newspaper, local radio, mobile phone etc. forecasts and interpreting them to the coastal environment

## Tides

On completion of this module students should be able to source and apply tidal information to the area they are planning their trip planning exercise in.

*This session should include practical exercises in interpreting tidal information. See Appendix Exercise 2 for example.*

- The basic cause and effect of tidal movement on a daily and monthly basis;
  - Effect of gravitational pull of moon
  - Reason why tide is approx 1 hour later each day
  - Cause of springs and neaps tides
  - Effect of the above on the range of the tide
  - Effect of the above on tidal streams rates
  - Understanding of how this relates to trip planning regarding timings, sea conditions, launching and landing
- The cause and effect of tidal movement on an annual basis;
  - Effect of equinoxes due to elliptical orbit of earth
  - Effect of elliptical orbit of moon (Apogee & Perigee)

- Where to obtain tidal information including range;
  - Tide tables and almanacs including awareness that they may provide info on heights or range
  - The ability to recognise springs / neaps from tide tables
  - [www.ukho.gov.uk](http://www.ukho.gov.uk)
  - Local papers etc
  
- The rule of constants, 12ths, 3rds;
  - Awareness of primary and secondary ports (constants)
  - Understanding the rule of 12ths in relation to volume of water especially with respect to timings for launching / landing and the effect on reefs in forming boomers
  - Understanding the rule of 3rds rule in relation to tidal stream rates especially with respect to journey times, crux points, and sea conditions
  - Awareness of limitations to these rules especially where tides are constricted by land. E.g. the Solent, Corryvreckan, Strangford Narrows, Menai Straits
  
- The effect of wind and land features on tidal movement;
  - Effect of wind with and against tide
  - Effect of headlands and constrictions in creating tide races
  - Effect of headlands, bays etc in the formation of eddies
  - Effect of underwater topography on creating overfalls
  - Awareness of rip currents in surf environment
  
- The awareness and understanding of tidal anomalies;
  - Examples of where the tide stream bears little or no relation to local high water
  - Examples of where tidal streams flow for different time periods e.g. 9 hours on flood and 3 on ebb or where it always flows in one direction due to eddies

## **2. Sources of information**

### OS Maps & Charts

On completion of this module students should be able to plan a coastal trip on both an OS map and a chart recognising the limitations of the OS map.

- The understanding and application of Latitude and Longitude and grid references;
  - Understanding that Latitude and Longitude relate to degrees in a circle
  - Awareness of Parallels of latitude and Meridians of Longitude
  - How to take a Latitude and Longitude from the chart
  - How to take a 6 figure grid reference from a map

- The understanding and application of scale and measurement using Nautical miles, land miles as well as kilometres;
  - Awareness of the fact that 1 minute of Latitude = 1 nautical mile and = 1.8km (approx 2km)
  - Awareness of the value of working in nautical miles on the sea – as tidal information is given in knots
  - Understanding of what scale is
  - Awareness of range of scales for charts
  - How to take a measurement using dividers on the chart
  - Where to find the Latitudinal scale on an OS map
  
- How to take a true and magnetic bearing from OS maps and charts;
  - Understanding the importance of being aware of general direction prior to taking a bearing
  - Taking a grid bearing from an OS map using grid lines and hand held compass
  - Taking a true bearing from a chart using Breton plotter and/or parallel rules
  - Being aware of magnetic variation and;
    - adding as required from map to ground
    - subtracting as required from ground to map
  - Understanding risks of metallic interference causing deviation of a bearing
  
- How to interpret the variety of information on OS maps and charts;
  - Being aware of key information on a chart;
    - Lights flashing sequence and colour
    - Buoyage including cardinal and lateral marks
    - Flood & ebb tides
    - Eddies and overfalls
    - Tidal diamonds
    - Leading lights and transits
    - Shipping lanes
    - Heights / depths
  - Being aware of key information on an OS map;
    - Beaches
    - Telephones
    - Access / egress
    - Micro navigation feature such as rocky islands, indentations, obvious small bays etc
  
- The advantages and disadvantages of OS maps and charts;
  - Costs
  - Scale issues
  - Appropriate marine information available on each
  - Awareness of the value of “creating” a working map by transferring the chart information on an OS map before laminating, students should see examples of this

### Pilots (Admiralty and Sailing Directions)

On completion of this module students should be able to extrapolate information from the pilot in order to plan a coastal trip on both a chart and OS map recognising the limitations of the OS map.

- The sourcing, understanding and application of information from the coastal pilot;
  - How to find and use tidal stream information
  - How to apply information on shallows / reefs with respect to breaks / boomers
  - The value of transferring the pilot information on an OS map before laminating

### Other Sources Information

- The value of information from local sources including sea kayak guides, local clubs and mariners
- Tidal diamonds
- Tidal stream atlas

Students should see some examples of these.

## **3. Coastal planning**

### Trip planning

- The various factors to take into account when planning a trip including calculation of timings, group skill level, logistics, and environmental factors
- How to calculate Estimated Time of Departure (ETD) and Estimated Time of Arrival (ETA);
  - Awareness of Crux points in terms of tidal streams.
  - Awareness of escape points and routes
  - Awareness of estimated group speed / ability
  - Importance of shore contact and role of MCA
- How to create and use a tidal planning table;
  - See example in Appendix
- How to create and use a pictorial image of the relevant tidal movements;
  - See example in Appendix

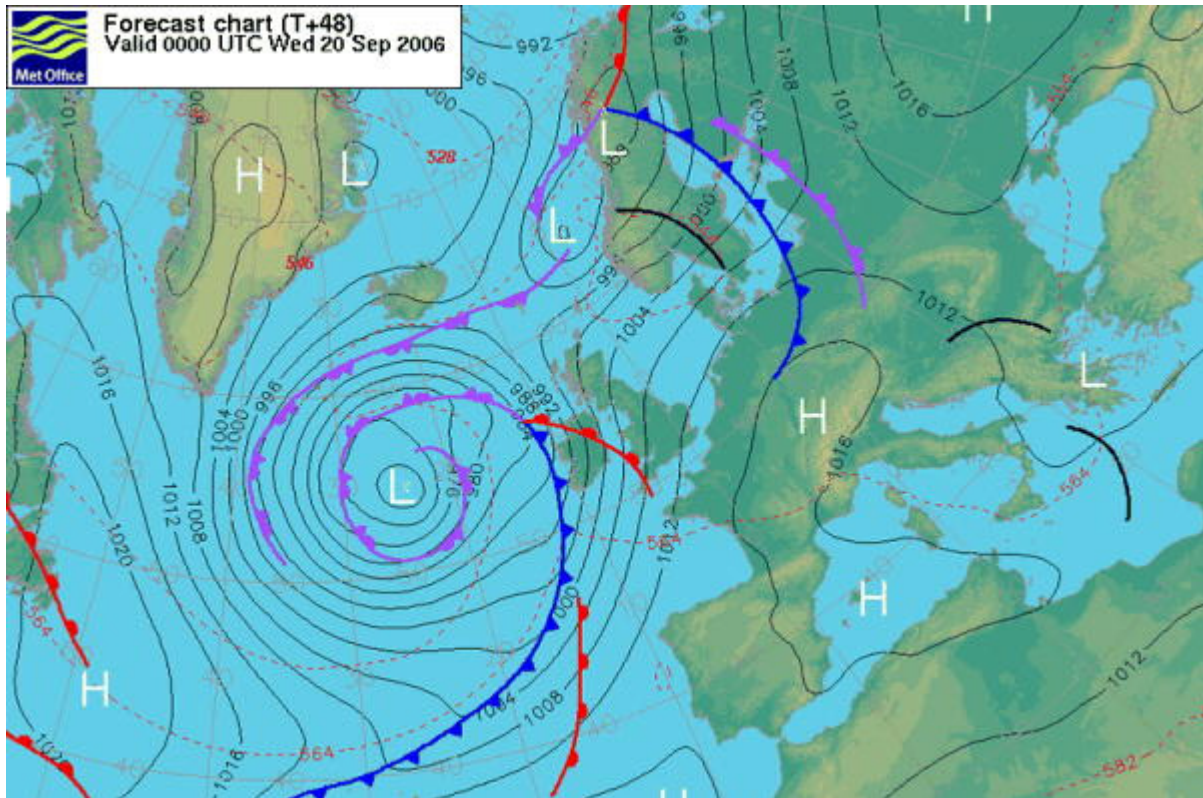
### The application of navigation theory

- How to calculate bearings for short crossings of tidal waters
- How to apply timing calculations on the water
- To be aware of time made good when utilising tidal flow
- How to relate map/chart information to the coastal environment
- How to use a natural transits, dead reckoning, and estimated positioning
- Application of Rules of the Road

## **Appendices**

1. Exercise 1 – Interpreting Weather
2. Exercise 2 – Tidal Planning
3. Exercise 3 – Chart Work
4. Sample Trip Planner
5. Running a combined Coastal and Open Water Navigation Course
6. Rules of the Road and Coast Guard Information
7. Sample Pre-course letter

## Exercise 1 – Interpreting Weather



Interpret the above chart to predict the weather on Wednesday 20 and Thursday 21<sup>st</sup> September

## Exercise 2 – Tidal Planning

1. Fill in the blanks

Port	Constant	Date	Time of HW 1	Time of LW 1	Time of HW 2	Time of LW 2	Springs or Neaps
Francoville	+ 01 52	2 <sup>nd</sup> January					
Brown Bay	+ 00 20	31 <sup>st</sup> March					
McClure's Point	- 04 33	27 <sup>th</sup> April					
Robinson's Cove	- 02 53	12 <sup>th</sup> May					
Hallsissey Island	- 06 00	10 <sup>th</sup> June					
Port Jeffs	- 05 24	22 <sup>nd</sup> July					
Stamp Reef	+ 00 56	29 <sup>th</sup> August					
Dennis Harbour	- 00 44	15 <sup>th</sup> September					
Trys Lough	- 05 29	2 <sup>nd</sup> October					
Devlin Hole	+ 00 10	21 <sup>st</sup> November					

**Exercise 3 - Chart Work**

Pick 2 points on the chart and work out the Lat/long and distance and bearing.

From Point 1			To Point 2				
Latitude	Longitude	Name	Latitude	Longitude	Name	Distance	Magnetic Bearing

## Sample trip planners

This can be added to map prior to lamination or laminated on to white card as a deck slate.

<b>HW DOVER:</b>	1. 2.	<b>LOCAL HW:</b>	1. 2.
<b>FLOOD TIDE STARTS:</b>	1. 2.		
<b>EBB TIDE STARTS:</b>	1. 2.		
<b>NOTES:</b>			

## Sample Trip planner

JOURNEY PLANNER			
HW DOVER		USEFUL VHF CHANNELS	SHORE CONTACT NO:
LOCAL HW			
TIDAL GATE 1 Location	Time of flood 1		Time of ebb 1
	Time of flood 2		Time of ebb 2
	Direction		Direction
	Rate		Rate
TIDAL GATE 2 Location	Time of flood 1		Time of ebb 1
	Time of flood 2		Time of ebb 2
	Direction		Direction
	Rate		Rate
TIDAL GATE 3 Location	Time of flood 1		Time of ebb 1
	Time of flood 2		Time of ebb 2
	Direction		Direction
	Rate		Rate
WEATHER FORECAST:			
NOTES:			

## Running a combined Coastal and Open Water Course

If a provider wished to run a course that combined both the BCU Coastal and Open Water Navigation and Tidal Planning Courses together the following combination of Learning Outcomes can be used. This breaks the course down into four sessions that would normally be 4-hours or half a day in duration each.

	Topic	Learning Outcomes
Session 1	Weather	Students should understand the following; <ul style="list-style-type: none"> <li>• The basic air movement patterns around the earth</li> <li>• Cause and effect of high pressure</li> <li>• Cause and effect of low pressure</li> <li>• How fronts develop</li> <li>• The typical weather associated with cold, warm and occluded fronts</li> <li>• How to identify the 10 main cloud types and their associated weather</li> <li>• The Beaufort scale and associated sea conditions</li> <li>• Where and when to obtain a shipping forecast</li> <li>• How to interpret the terms used in shipping forecasts</li> <li>• How to interpret a synoptic chart</li> <li>• Other sources of weather forecasts</li> </ul>
	Tides	Students should understand the following; <ul style="list-style-type: none"> <li>• The basic cause of tidal movement on a daily, monthly and annual basis</li> <li>• The effect of the elliptical orbit of both the earth and the moon</li> <li>• Cause and effect of changes in air pressure on tidal range</li> <li>• Where to obtain tidal information</li> <li>• The effect of relief on tidal movement</li> <li>• The effect of wind and tide</li> <li>• The rule of constants</li> <li>• The 12ths, 3rds and 50/90 rules</li> <li>• Finding the range of the tide</li> </ul>

	Topic	Learning Outcomes
Session 2	Charts	<p>Students should understand the following;</p> <ul style="list-style-type: none"> <li>• The reason for parallel lines of Latitude and converging lines of Longitude</li> <li>• That Nautical miles are based on the dimension of the earth</li> <li>• That charts use Mercator or gnomonic projection</li> <li>• How to give a lat/long location for a given place on the chart</li> <li>• How to measure distance between 2 points on the chart</li> <li>• How to take a true and magnetic bearing from the chart</li> <li>• How to interpret the information on depths, tides, beacons and lights from a chart</li> <li>• How to interpret a tidal diamond</li> <li>• The advantages of charts and OS maps</li> <li>• How to glean information from the pilot</li> <li>• The advantage of transferring information on to an OS map</li> <li>• How to read a tidal stream atlas</li> <li>• Where to gain further information</li> </ul>
Session 3	Coastal Navigation	<p>Students should understand the following;</p> <ul style="list-style-type: none"> <li>• The various factors to take into account when planning a trip</li> <li>• How to calculate ETD and ETA's from looking at Crux points</li> <li>• How to use a tidal planning table</li> <li>• How to create a pictorial image of the tidal movements on the relevant day</li> <li>• To be able to calculate bearings for short crossings of tidal waters</li> <li>• To be aware of time made good when utilizing tidal flow</li> <li>• How to use a natural transit</li> <li>• How to use dead reckoning and estimated positioning</li> <li>• How to do a resection</li> <li>• How to do a running fix</li> </ul>
Session 4	Open Crossings	<p>Students should understand the following;</p> <ul style="list-style-type: none"> <li>• The importance of making all the planning as accurate as possible</li> <li>• How to interpret a tidal stream atlas</li> <li>• How to interpret a tidal diamond</li> <li>• How to use a computation of rates table</li> <li>• The 3 methods used to plan an open crossing with an emphasis on the accuracy of method 3 – using tidal vector plots</li> </ul>

## Rules of the Road

- Give way to vessels restricted by their draft
- Give way to vessels in channels – seek shelter by buoys during periods of indecision!
- Cross at right angle to direction of shipping channels
- If crossing or entering busy harbours register intention with harbour master/authority on VHF or by mobile
- In open water, power and or overtaking boat must give way but carry white collision flare if regularly paddling in busy shipping/harbour areas as kayakers can be hard to see!
- Vessels should aim to pass each other port to port.
- Reflective strips should be on boats and paddles
- Awareness of simple collision regulations to include sound and signals

## Coast Guard

- Can be contacted on VHF on channel 16 or by mobile phone – it is useful to store coast guard number in your phone
- Coast Guard will require ETD and ETA, the number in group, colour of boats, safety equipment carried, your call sign (VHF) and contact telephone number
- If late back coast guard will not activate a search unless they are contacted by your shore contact or member of the public who noticed your car on the slipway!
- You can register your boat and call sign with the coast guard via the CG66 registration scheme
- You should write your name address and contact number on your boat in the event of it being lost at sea
- By contacting the coastguard you become their eyes on the water providing them with a second opinion in the event of a suspected incident in the area you are in

Dear

Thank you for enrolling on the BCU Coastal Navigation Theory Course. Please find enclosed a copy of the syllabus for the course and a timetable for the training.

As this course has been designed with the coastal paddler in mind, it is anticipated that those attending would have some experience of sea kayaking in simple coastal environment. Three day trips at BCU 3 Star Sea standard under suitable leadership is an appropriate minimum level of experience.

As navigation is a practical activity, which relies heavily on a set of tools - at least 50% of this course will be practical; therefore you should invest in the following personal items that are fundamental to navigation planning.

- [Prescribed map of a given area \(for trip planning exercise\) – could be included in course fee or directed by the tutor.](#)
- Silva type 4 or similar compass suitable for map work
- 2b pencils & rubber
- Notebook

At the end of the course you will have completed a number of take home trip planning exercises that will be useful as examples for future exercises. At least one exercise will include using the specified map.

At the end of the course your trainer will sign your logbook and the BCU will issue you with a certificate of completion.

Please bring logbook, membership card and certificate fee of £5 for BCU Members (£10 for non-members).