

# Guidelines - NWKO (NCV) Course

## Training Circular No. 13 of 2004

No:11-TR(34)/2003

Dated: March 22, 2004

Sub: Guidelines - NWKO (NCV) Course

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Maritime safety and efficiency is of utmost concern to the Directorate General of Shipping(DGS), the constituted authority of the Government of India for all maritime affairs.

It was noticed that some training institutes barely met the minimum standards set by the Directorate, while other provided training facilities that were world class. In order to bring about uniformity of training, amenities and equipment provided by all, old guidelines were revised and new ones formulated. This was done by the DGS in consultation with the training institutes and employers (shipowners and manning agencies). Draft guidelines were displayed on the website of the DGS and comments invited from interested parties, regardless of the position or office held.

Meetings of interested parties were held and modification made to the draft guidelines. In keeping with Government policy, the guidelines have been made in as transparent manner as practicable. The final guidelines for [NWKO\(NCV\) Course](#) is attached herewith.

It is expected that training institutes would follow these guidelines in letter and spirit.

The above guidelines shall come into force w.e.f. **01.05.2004**.

This issues with the approval of the Director General of Shipping and ex-officio Addl. Secretary to the Government of India.

Sd/-  
(Naresh Salecha)  
Sr.Dy. Director General of Shipping

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## GUIDELINES FOR THE CONDUCT OF

## NWKO (NCV) COURSE

## ISSUED BY

## THE DIRECTORATE GENERAL OF SHIPPING

To avoid unnecessary repetition, reference has been made herein to DGS Order no: 1 Aof 2003(Guidelines for the conduct of Pre-Sea Training courses for Merchant Navy) wherever appropriate.

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**Officer In Charge of a Navigational Watch (Near Coastal Voyages)  
(NWKO NCV) COURSE**

**1. BASIC DETAILS OF THE COURSE**

**1.1. Aims:**

This course covers part of the education and training required under Regulation II/1 (NCV) and aims to meet the standards of competence specified in Section A-II /1 (NCV) of the STCW 95.

Appendix M-II/5C of META Manual Vol. II should be used in the preparation of material for this course.

1.2. Objectives:

The objective of this course is to prepare a candidate to appear for the examinations of Certificate of Competency as NWKO (NCV).

1.3. Application:

Compliance with these guidelines shall be mandatory for all institutes from **1<sup>st</sup> May 2004**.

2. **QUALIFICATION & ELIGIBILITY OF STUDENTS**

2.1. Entry Standards:

Candidates must comply with the eligibility criteria specified in Rule 17 of M.S. (STCW) Rules 1998 and Section M-II/5 of META Manual Vol. I.

2.2. Required Attendance:

The minimum attendance required shall normally be 90%. However, in exceptional cases, the head of the institution may accept attendance of 75% and above, if he is satisfied that the reasons for reduction from 90% are genuine and that the student's performance in the course has been good. The institute shall keep proper records of such cases and intimate Chairman of respective Academic Council. On successful completion of the course, a student will be issued a certificate, by the training institution, as per Annexure 2. Students falling short of the required attendance, or unsuccessful in their Internal Assessment Tests, must not be given this certificate or any similar certificate that could be mistaken for such a certificate.

2.3. Course intake limitations:

2.3.1. The number of students should not exceed 40 per class and they shall be subjected to adequate supervision and internal assessment.

2.3.2. For practical and other work where greater inter-action is necessary, the class should be sub-divided into groups of not more than 8 students per instructor.

3. **INFRASTRUCTURE REQUIREMENT**

3.1. Physical requirement for classrooms, black/white boards, overhead projector, screen, notice board, faculty room, study environment and teaching equipment are to be provided as per DGS order 1 of 2003.

3.2. The institute shall have a library-cum-reading room of not less than 36m<sup>2</sup> in area.

3.3. List of library books and equipment to include the items contained in **Annexure 3**.

4. **COURSE DETAILS**

4.1. Course duration: 16 weeks.

4.2. Course outline: As per META Manual Vol. II Appendix M-II/5C.

4.3. Detailed teaching syllabus: As per Annexure 1.

5. **HOLIDAYS**

5.1. Sundays shall be holidays.

5.2. Independence Day and Republic Day shall be compulsory holidays.

5.3. Students shall normally enjoy the holidays observed by the Govt of the state in which the institute is located.

6. **FACULTY REQUIREMENT**

6.1. Qualifications and experience of course in charge:

6.1.1. Certificate of Competency, issued or recognised by the Government of India, as Master of a Foreign Going Ship  
and

6.1.2. At least 5 years service on Merchant ships  
and

6.1.3. At least one year in the rank of Master and one year experience as a regular (full time) faculty member in ROSC, ARPA Course, RANSCO, SMS Course, Pre-Sea Cadet degree course or Competency Courses  
or

One year as Chief Officer and two years experience as regular (full time) faculty member in ROSC, APRA Course, RANSCO, SMS Course, Pre-Sea Cadet degree course or Competency Courses

or

Extra Master Certificate.

6.2. Qualifications and experience of faculty members:

6.2.1. Certificate of competency, issued or recognised by the Government of India, as Master of a Foreign Going Ship and

6.2.2. At least 5 years service on Merchant ships of which at least one year should have been at management level.

6.2.3. In lieu of the above, a person with specialisation & 5 years experience in the field related to the lecture.

6.3. Training of Trainers & Assessors Course:

As per DGS Order no: 1 of 2003.

6.4. Visiting faculty members:

Qualifications and experience of visiting faculty members should be the same as that of regular faculty members.

6.5. Age limit for regular faculty members:

As per DGS Order no: 1 of 2003.

## 7. FACULTY STRENGTH

1.1. For a class (maximum 40 students), not less than two Master Mariners (including the course in-charge) shall be the regular (full time) faculty. However, in cases where Institute is also conducting other courses that require Master Mariner faculty, one Master Mariner (including the course in-charge) on regular (full time) basis will suffice provided at least two Master Mariners on regular basis form the faculty for this course. Additional faculty members may be on regular (full-time) or on visiting (part time) basis.

7.1 A minimum of 50% of the lectures on the weekly timetable shall be delivered by regular (full time) faculty members may be on full-time or on visiting (part time) basis.

7.2 Additional faculty members may be on full-time or on visiting (part time) basis.

## 8 COURSE DURATION

A total of 480 hours of lectures, practical training and internal assessment.

## 9 ASSESSMENT

The institute shall carry out two written internal assessments, one of which should be conducted mid way during the course and the other, near the end of the course.

## 10 QUALITY STANDARDS

As per DGS Order no: 1 of 2003.

## 11 INSPECTIONS

As per DGS Order no: 1 of 2003.

## 12 FEES TO GOVT.

As per DGS Order no: 1 of 2003.

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### Annexure 1 - DETAILED TEACHING SYLLABUS

#### SUBJECT : TERRESTRIAL AND COASTAL NAVIGATION

#### TOPICS

#### TEACHING METHOD / HOURS

Lecturers Exercise Practical

**Competence No. 1: Plan and conduct  
a passage and  
determine position**

**10.1 Knowledge of the precaution to be taken to prevent  
pollution of the Marine environment while**

**1.1 Terrestrial and Coastal Navigation :**

1.1.1 Definitions :	6	-	-
- earth			
- earth axis			
- poles			
- equator			
- meridians			
- latitude			
- parallels of latitude			
- prime meridian			
- longitude			
- difference of latitude and difference of longitude			
- nautical mile			
- cable and know			
1.1.2 Charts :	3	-	-
- natural scale			
- chart catalogue			
- plan charts			
- mercator charts			
1.1.3 Directions by	2	-	-
- gyrocompass			
- magnetic compass			
1.1.4 Compass corrections :	2	4	-
- deviation			
- variation			
- compass error			
1.1.5 Distances :	2	2	-

- measurement of distance between two positions on a mercator chart

1.1.6 Position lines and positions : 2 2 -

- definition of a position
- finding the position by range and bearings

1.1.7 Plane Sailing : 8 6 -

- departure, d'lat and distance relationship
- true course
- thumb line
- parallel sailing formula
- distance between two positions
- use of traverse table

1.1.8 Chartwork exercises : 4 20 -

- allowing and counteracting current and leeway
- tidal stream
- running fix
- horizontal and vertical sextant angles
- finding out actual set and rate of current

1.1.9 Information from charts, lists of lights and other publications: 4 2 -

- publication 5011
- tide tables
- IALA system of buoyage
- raising/dipping
- first/last sighting distances
- use of Decca lattice charts
- passage planning

use of Indian charts and Nautical Publications

1.1.10 Tides : 3 6 -

- range
- duration of tide
- height of tide
- spring and neap tides
- standard and secondary port

- tide calculations
- heights for intermediate times & visa-versa

1.1.11 Keeping a log :	2	-	-
- procedures for keeping log during sea passages			
- coastal navigation and at anchor			
<b>TOTAL</b>	<b>21</b>	<b>42</b>	<b>-</b>

## **SUBJECT : CELESTIAL NAVIGATION**

<b>TOPICS</b>	<b>TEACHING METHOD / HOURS</b>		
	<b>Lecturers</b>	<b>Exercise</b>	<b>Practical</b>
<b>Competence No. 1: Plan and conduct a passage and determine position</b>			
	3	-	-
<b>1.2 Celestial Navigation</b>			
1.2.1			
- celestial sphere			
- celestial poles			
- celestial meridians			
- declination of bodies			
- nautical almanac			
1.2.2 Hour angle :	3	-	-
- GHA			
- LHA			
- SHA			
- "d" or "v" corrections			
1.2.3	3	-	-
- rational horizon			
- zenith, nadir			
- true altitude			
- azimuth			
- true zenith distance			
1.2.4 Sextant and altitude corrections:	4	4	-

- reading a sextant
- index error
- visible, sensible and rational horizons
- true altitude
- observed altitude
- dip
- refraction
- semi-diameter and parallax

1.2.5 Amplitude : 2 4 1

- theoretical and visible sunrise and sun set
- calculation of true amplitude
- Twilights

1.2.6 Time and equation of time : 2 4 1

- relationship between LHA (sun) and LAT
- mean solar day
- equation of time
- GMT
- LMT and longitude relationship
- Zone and standard times
- time signals

1.2.7 Nautical Almanac : 2 - -

- information in Nautical Almanac and using it for celestial observations

1.2.8 Latitude by meridian altitude: 3 - -

- calculation of latitude by meridian altitude

1.2.9 Pole Star observations: 2 3 -

- identification of Polaris
- $a_0$ ,  $a_1$ ,  $a_2$  corrections and calculation of azimuth and position line
- a position through which it passes

1.2.10 Position fixing : 5 5 -

- long by chron
- intercept
- ex-meridian methods of sights
- true azimuth of a body
- position finding by simultaneous & staggered observations

1.2.11 Errors of compasses ' Azimuths: 3 5 -

- calculation of magnetic compass and gyro compass errors by observing heavenly bodies by using ABC tables
- magnetic variation and deviation
- transit bearings

**TOTAL 34 25 1**

## SUBJECT : BRIDGE EQUIPMENT

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical
<b>Competence No. 1: Plan and conduct a passage and determine position</b>			
	2	-	-
<b>1.3 Electronic Systems of Position Fixing</b>			
1.3.1 Basic principles of hyperbolic navigation system : - hyperbola - principles of the hyperbola - combining hyperbolic patterns to ascertain positions			
1.3.2 Decca Navigator system : - principle - working, errors	6	-	-
1.3.4 Global Positioning Systems (GPS) : - basic principle - errors of GPS system	3	-	-
1.3.5 Electronic Charts Display and Information System (ECDIS) : Principle of ECDIS - comparison of ECDIS and paper charts - IMO requirements for ECDIS	2	-	1
<b>Echo ' sounders and Speed Measurement</b>			
1.3.6 Echo sounders : - basic principle - block diagram - operation and errors of echo sounder	3	-	-
1.3.7 Speed log : - basic principle of Electro magnetic log - pressure tube	2	-	-
<b>Compass ' Magnetic and gyro</b>			
1.3.8 The magnetism of the earth and the ship's deviation: - simple magnet	3	-	-

- magnetic field			
1.3.9 The magnetic compass :	3	-	-
- liquid card magnetic compass			
- deviation			
- lubber line			
- compass error			
1.3.10 The gyro ' compass :	3	-	1
- free gyroscope			
- gyroscopic inertia and precession			
- gyro error			
1.3.11 The automatic pilot :	2	-	-
- principle			
- functions			
- auto pilot alarm			
<b>Steering control systems</b>			
1.3.12	3	-	-
- knowledge of steering			
- operational procedures			
- change over from manual to auto and vice versa			
- adjustment of controls for optimum performance			
<b>TOTAL</b>	<b>32</b>	<b>-</b>	<b>2</b>

## SUBJECT : METEOROLOGY

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical
<b>Competence No. 1: Plan and conduct passage and determine position</b>			
<b>1.4 Meteorology</b>			
<b>The Elements</b>			
1.4.1 The atmosphere, its composition and physical properties :	2	-	-
- Troposphere			
- water vapour			
- evaporation			
- condensation			
- latent heat			
- dewpoint			
- absolute humidity			

- relative humidity			
1.4.2 Atmospheric Pressure :	2	-	-
- definition of pressure			
- change of pressure with height			
- average pressure			
- isobar			
1.4.3 Shipborne meteorological instruments	2		2
- simple aneroid barometer			
- thermometer			
- hygrometer			
- Stevenson's Screen			
- Whirling Psychrometer			
- Anemometers			
1.4.4 Wind :	2	-	-
- Beaufort scale of wind force			
- pressure gradient force			
- Coriolis force			
- Buys-Ballot's Law			
- apparent and true wind			
1.4.5 Cloud and precipitation :	2	-	-
- formation of clouds			
- different types of clouds			
- classification of clouds as per height			
- precipitation			
1.4.6 Visibility :	2	-	-
- formation of fog			
- mist and haze			
- different types of fog			
- effect of fog mist and haze and other meteorology conditions on visibility			
1.4.7 Weather Systems :	3	-	-
- the seven basic types of Isobaric Patterns			
- Tropical Revolving Storms and the weather associated with them			
1.4.8 Climatology : The wind and pressure systems over Indian ocean:	3	-	-
- mean surface pressure and wind distribution			
- monsoon			
- land and sea breeze			
1.4.9 Weather Reports and Forecasting :			
1.4.9.1 Weather information available to shipping:	2	-	-
- meteorological offices			
- facsimile machine			
1.4.9.2 Recording and reporting weather observations:	5	-	-
- coding and decoding of weather messages	3	2	
<b>TOTAL</b>	<b>28</b>	<b>2</b>	<b>2</b>

## SUBJECT : BRIDGE WATCHKEEPING & EMERGENCIES

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practicals
<b>Competence No. 2: Maintain a safe navigational watch</b>			
<b>2.1 Watchkeeping Arrangements and Procedures</b>			
2.1.1 The content, application and intent of COLREG 72 : - rule 1 of 38	30	-	-
2.1.2 Keeping a safe navigational watch : - principles observed in keeping safe navigational watch - relieving of duties - procedure of taking over watches - action on receiving storm warning - entries in logbook	4	-	-
2.1.3 Keeping an effective anchor watch in port under normal circumstances : - relieving of duties - procedure of taking over watches - action on receiving storm warning - entries in logbook	2	-	-
2.2 Knowledge of effective bridge team work procedures	2	-	-
2.3 The use of routing in accordance with the General Provisions on Ship's Routing	2	-	-
TOTAL	40		

### Competence No. 4 : Respond to emergencies

#### 4.1 Contingency Planning

4.1.1 Contingency plans for response to emergencies: - contents of muster list - remote control operations - command team - emergency team	3	-	-
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- back-up team and engine room team
- need of good communication
- actions taken in various emergencies

#### **4.2 Measures which should be taken in emergencies for the protection and safety of the ship, passengers and crew**

4.2.1 Precautions to be taken when beaching a vessel:	1	-	-
<ul style="list-style-type: none"> <li>- circumstances when the vessel can be beached</li> <li>- procedure of beaching</li> </ul>			
4.2.2 Actions to be taken on stranding :	2	-	-
<ul style="list-style-type: none"> <li>- initial damage</li> <li>- assessment and control</li> <li>- sounding of compartments</li> <li>- use of ground tackle</li> </ul>			
4.2.3 Actions to be taken following collision :	2	-	-
<ul style="list-style-type: none"> <li>- initial damage</li> <li>- assessment and control</li> <li>- stoppage of engine</li> <li>- repairing life boat</li> <li>- distress or urgency signal</li> </ul>			
4.2.4 Precautions for the protection and safety of passengers in emergency situations :	2	-	-
<ul style="list-style-type: none"> <li>- warning the passengers</li> <li>- evacuating all passengers</li> <li>- taking a roll call</li> <li>- instructing passengers during drills</li> <li>- supply of blankets</li> </ul>			
4.2.5 Means of limiting damage and salving the ship following a fire or explosion :	2	-	-
<ul style="list-style-type: none"> <li>- cooling of compartment boundaries</li> <li>- inspection for damage</li> </ul>			
4.2.6 Procedure for abandoning ship :	2	-	-
<ul style="list-style-type: none"> <li>- transmission of distress call and until acknowledge</li> <li>- extra food and blanket</li> <li>- emergency radio</li> <li>- warm clothing and lifejackets</li> <li>- launching in heavy weather</li> <li>- use of rocket line-throwing appliances</li> <li>- breeches buoy</li> </ul>			
4.2.7 Use of auxiliary steering gear and the rigging and use of jury steering arrangements:	2	-	-
<ul style="list-style-type: none"> <li>- arrangement of auxiliary steering gear</li> <li>- securing the rudder in the event of a broken rudder stock</li> </ul>			

- constructing a jury rudder			
4.2.8 Arrangements for towing and being taken in tow :	2	-	-
- towing gears onboard ship			
- method of towing disabled ships			
- communication between two ships			
4.2.9 Rescue of persons from sea or from a vessel in distress :	2	-	-
- use of oil in rough weather			
- waiting for day light			
- providing a lee			
- method of rescue when sea conditions are too dangerous to use boat			
<b>TOTAL</b>	<b>17</b>	-	-
Competence No. 5 : Respond to a distress signal at sea			
5.1 Measures for assisting a vessel in distress :	3	-	-
- contents of IAMSAR			
- various search pattern and signals to be made by ships & aircraft			
5.2 Man-overboard procedures :	2	-	-
- initial actions			
- preparations for rescuing man			
- Williamson turn			
- picking up man			
- picking up boat			
<b>5.3 Knowledge of the contents of the IMO International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)</b>	<b>5</b>	-	-
<b>TOTAL</b>	<b>10</b>	-	-

## SUBJECT : SIGNALS

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical
Competence No. 7: Transmit and receive information by visual signaling and other means			

## 7.1 Signaling by Morse Code (Transmission & reception):

- morse symbols for the alphabet and numerals	4	-	10
- send and receive Morse signals by flashing light at the rate of 15 characters per minute, parts of a signal made by flashing light, erase signal, repeat signal, AA, AB, WA, WB and BN	-	-	50
- distress signal by flashing light	-	-	2

## 7.2 Using International Code of Signals :

- recognition of International codes flags and pendants	8	-	-
- purpose of International code of signals	1	-	-
- use of substitute flags	2	-	-
- call flags, answering pendant, the end of a signal flags, identity signals	4	-	-
- decimal point, azimuth, bearing, course, date, latitude, longitude, distance	2	-	-
- speed, time indication by flag, signals for depth, meanings of single-letter signals	2	-	-
- International Code Signal of Distress	2	-	-
<b>TOTAL</b>	<b>25</b>	<b>-</b>	<b>52</b>

## TEACHING METHOD / HOURS

### TOPICS

Lecturers      Exercise      Practical

## Competence No. 8: Manoeuvre the ship

8.1 The effects of various deadweights, draughts, trim, speed and under-keel clearance on turning circles and stopping distances :	3	-	-
- advance			
- transfer			
- drift angle			
- tactical diameter			
- track reach			
- head reach			
- side reach			

- turning circles of a ship			
- directional stability			
8.2 Effect of wind and current on ship handling :	1	-	-
- effect of wind on a given ship while moving and when making large turns			
- effect of current on the motion of the ship			
- use of an anchor to dredge down with a current			
8.3 Manoeuvres for the rescue of a man overboard:	1	-	-
- immediate action			
- delayed action and person missing situations			
- single turn			
- Williamson turn Scharnow turn			
- sequence of actions when a person is seen to fall overboard			
8.4 Squat and shallow 'water and similar effects:	1	-	-
- shallow water			
- squat			
- blockage factor			
8.5 Proper procedures for anchoring and mooring :	2	-	-
- procedure for anchoring			
- use of anchor buoys			
- marking of the cable			
- sealing of surpling pipes			
- joining of two mooring ropes			
- slip wire			
- rigging pilot ladder			
- making fast tugs			
- using fenders during berthing			
<b>TOTAL</b>	<b>8</b>	<b>-</b>	<b>-</b>

## SUBJECT : CARGOWORK

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical
Competence No. 9: Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage			

### 9.1 Dry Cargoes

9.1.1	Inspection and preparation of holds :	2	-	-
-	general inspection of holds			
-	items to be inspected			
-	importance of cleaning holds			
-	using dunnage			
-	using spar ceiling			
-	blanking of ballast lines to the deep tanks			
9.1.2	Segregation and separation of cargoes :	2	-	-
-	segregation of different cargoes with reference to dangerous goods			
-	dry, wet & delicate cargoes			
-	separating adjacent parcel of cargo			
9.1.3	Securing cargoes :	2	-	-
-	methods of blocking			
-	lashing			
-	shoring and tomming cargo			
-	method of securing heavy loads and vehicles and trailers			
9.1.4	Ventilation and control of seat:	2	-	-
-	control of sweat by ventilation			
-	operation of ventilation system			
-	cargoes requiring special ventilation			
9.1.5	Deck Cargo :	3	-	-
-	efficient securing of deck cargoes			
-	proper battening of cargo before loading deck cargo			
-	safe access to essential equipment and spaces			
-	unobstructed view from the navigating bridge			
-	maximum permissible load			
-	IMO code of safe practice for ships carrying timber deck cargo			
9.1.6	Refrigerated cargo :	2	-	-
-	preparation of hold for loading refrigerated cargo			
-	inspections of the cargo			
-	use of brine traps			
-	purpose of temperature recording			
9.1.7	Container cargo :	2	-	-
-	arrangement of a container ship			
-	lashing and securing arrangement of containers			
-	types and sizes of containers			
9.1.8	Keeping an effective deck watch in port under normal circumstances :	2	-	-
-	relieving of duties			
-	procedure of taking over watches			
-	action on receiving storm warning			

## 9.2 Cargo Handling

9.2.1 Cargo handling equipment:	3	-	-
- care and maintenance of standing rigging			
- topping lifts			
- cargo runners			
- cargo blocks and derrick heel fittings			
- rigging of derricks for loading and discharging of cargoes			
- ship rigging plan			
- use of slings			
- snotters			
- canvas slings			
- trays			
- pallets			
- nets			
- chain slings			
9.2.2 Cargo handling safety :	3	-	-
- safe working load of a gear			
- visual inspection before the start of cargo			
- mechanically or hydraulically operated hatches			
- precautions while doing cargo operations			
- effect of heavy lift on sea worthiness and stability of the ship			
- effective communication during loading and discharging			
9.2.3 Deep tank cargoes :	1	-	-
- cleaning and preparation of deep tanks for loading			
- securing of deep tank lids			

## 9.3 Dangerous, Hazardous and Harmful (Marine

### Pollutants) Cargoes

9.3.1 Dangerous goods in packaged form :	2	-	-
- classification of IMDG cargo			
- use of IMDG code			
- precautions to be taken while working with IMDG cargo			
- MFAG			
- EmS			
- IMGS			
- Segregation tables			
9.3.2 Bulk cargoes (other than grain) :	2	-	-
- IMO code of safe practice for solid bulk cargoes			
- angle of repose			
- flow moisture point			
- flow state			
- transportable moisture limit			
- preparations of holds prior to loading bulk cargoes			

- hazards associated with coal cargoes			
9.3.3 Bulk grain cargoes :	2	-	-
- bulk cargo code			
- preparations of holds for the carriage of grain			
- insect or rodent infestation			
- use of shifting boards			
9.3.4 Keeping a safe deck watch in port when carrying hazardous cargo :	3	-	-
- hazardous cargo			
- special requirements when carrying hazardous cargo			
- procedure for entry into enclosed spaces and permit to work			
<b>9.4 Oil Tanker Piping and Pumping</b>			
<b>Arrangements :</b>			
9.4.1 Tanker Arrangement :	2	-	-
- cargo tanks			
- pump rooms			
- slop tanks			
- cofferdams			
- deep tanks			
9.4.2 Cargo piping systems :	2	-	-
- direct pipe line and ring 'main system			
- piping arrangement in pump room			
9.4.3 Cargo pumps :	2	-	-
- different types of pumps for cargo operations			
- use of educators			
	2	-	-
<b>9.5 Precautions before Entering Enclosed or Contaminated Spaces :</b>			
- potentially dangerous spaces like cargo, fuel and ballast tanks			
- pump rooms			
- cofferdams			
- duct keels			
- oxygen content 21% by volume			
- need of thorough ventilation of space			
- need of preparing safety check list			
- use of various instruments to check the gases in a compartment			
<b>9.6 Stowage and Stability Calculations :</b>			
9.6.1 Cargo calculations and cargo Plans :	3	2	-
- stowage factor			
- broken stowage			

- load density
- ullage
- calculation of cargo to be loaded
- extracts from cargo plans
- making a cargo plan

9.6.2 Knowledge of the effect of the cargo including heavy lifts on the seaworthiness and the stability of the ship	1	-	-
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<b>TOTAL</b>	<b>45</b>	<b>2</b>	<b>-</b>
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## **SUBJECT : SHIP SAFETY & ENVIRONMENTAL PROTECTION**

<b>TOPICS</b>	<b>TEACHING METHOD / HOURS</b>		
	<b>Lecturers</b>	<b>Exercise</b>	<b>Practical</b>

### **Competence No. 10: Ensure compliance with pollution prevention requirements**

#### **10.1 Knowledge of the precaution to be taken to prevent pollution of the Marine environment while**

<ul style="list-style-type: none"> <li>- Bunkering</li> <li>- loading/discharging Oil, Chemicals and hazardous cargoes</li> <li>- tank cleaning</li> <li>- pumping out bilges</li> <li>-</li> </ul>	2	-	-
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#### **10.2 Knowledge of anti-pollution procedures & all associated equipment-Oil discharge monitoring and Control system (ODMCS)**

10.2.1 The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)	1	-	-
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10.2.2 Technical annexes : - Annex ' I to V	1	-	-
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10.2.3 Annex I : - oil discharge, monitoring and control system - oil and water mixture - particularly sensitive areas	1	-	-
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10.2.4 Control of oil from machinery spaces : - discharge provisions for oil and oily waste from machinery spaces outside special areas - within special areas - bilge water holding tank	1	-	-
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- oil water separator			
10.2.5 Oil Record Book (Part I, Machinery Space Operations) and Part II (Cargo and ballast operations)	1	-	-
- entries to be made in oil record books			
10.2.6 Precautions to be taken to prevent accidental pollution by oil :	1	-	-
- checklist while bunkering and transferring in oil			
- precautions while carrying out any oil operations			
10.2.7 Procedure and arrangements for Chemical carriers, Record Book for Chemical Cargoes	1	-	-
10.2.8 Carriage of Chemicals in package form	1	-	-
10.2.9 Operating procedures of anti-pollution equipment:	1	-	-
- sewage plant,			
- incinerator			
10.2.10 Knowledge of Garbage Management System	1	-	-
<b>TOTAL</b>	<b>12</b>	<b>-</b>	<b>-</b>

## SUBJECT : SHIP CONSTRUCTION

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical
<b>Competence No. 11: Maintain sea-worthiness of the ship</b>			
<b>11.1 Ship Construction</b> (Including corrosion and maintenance of Hull and fittings)			
11.1.1 Ship dimensions and form : General arrangement of	2	-	-
- general cargo ships			
- tankers			
- bulk carriers			
- combination carriers			
- containers			
- roro-ships			
- passenger ships			
- definitions of camber			

- rise of floor			
- flare			
- shear			
- rake			
11.1.2 Ship stresses :	1	-	-
- hogging			
- sagging			
- racking			
- panting			
- pounding			
- slamming			
11.1.3 Hull structure :	6	-	-
- proper names for the various parts			
- standard steel sections			
11.1.4 Bow and stern:	3	-	-
- stern frame			
- structural arrangement forward and aft to withstand panting and pounding			
11.1.5 Fittings :	4	-	-
- water tightness of the hatches			
- opening in oil tankers			
- chain lockers and attachment of cables			
- bilge piping system			
- ballast system			
- sounding and air pipes			
11.1.6 Rudders and propellers :	3	-	-
- construction of rudders and propeller			
- controllable pitch propeller			
- stern tube arrangement			
11.1.7 Load lines and draught marks :	2	-	-
- deck line			
- free board			
- Plimsoll line			
<b>TOTAL</b>	<b>21</b>	<b>-</b>	<b>-</b>

## SUBJECT : SHIP STABILITY

TOPICS	TEACHING METHOD / HOURS		
	Lecturers	Exercise	Practical

## Competence No. 11: Maintain seaworthiness of the ship

### 11.2 Stability :

11.2.1 Displacement :	1	-	-
- displacement/draft curve and table	3	3	-
- light displacement			
- dead weight			
- TPC, MCTC			
- block co-efficient			
- water plane co-efficient			
11.2.2 Buoyancy :	1	1	-
- meaning of buoyancy			
- reserve buoyancy			
11.2.3 Fresh water allowance :	1	2	-
- calculation of TPC, FWA and DWA in various densities			
11.2.4 Statical stability:	3	3	-
- centre of gravity			
- centre of buoyancy			
- righting lever			
- righting moment			
11.2.5 Initial stability :	2	2	-
- stability up to 10' angle of heel			
- transverse metacentre			
- hydrostatic curves			
11.2.6 Angle of loll :	1	1	-
- definition and correction of angle of loll			
11.2.7 Movement of the centre of gravity :	2	4	-
- change of centre of gravity of a ship by loading			
- discharging			
- shifting of weight			
11.2.8			
11.2.8.1 List :	3	4	-
- calculation of list while loading, discharging or shifting weights			
- correction of list			
11.2.8.2 Trim :			
- trim tables			
11.2.9 Effect of slack tanks :	2	2	-
- free surface effect and its calculation			
- calculation of GM fluid			
11.2.10 Actions to be taken in the event of partial loss of intact buoyancy :	2	2	-

-	closing of watertight doors			
-	cross flooding arrangement			
11.2.4	Statical stability:	3	3	-
-	centre of gravity			
-	centre of buoyancy			
-	righting lever			
-	righting moment			
	<b>TOTAL</b>	<b>19</b>	<b>22</b>	<b>-</b>

**Competence No. 15 : Monitor compliance  
with legislative requirements**

15.1	To demonstrate basic working knowledge of the relevant IMO convention concerning	3	-	-
-	SOLAS			
-	MARPOL			
-	Load Line			
-	ISM Code and			
-	STCW 95			
	With regards to contents, objectives, application, amendments			
15.2	Code of Safe working practices for Merchant Seamen	3	-	-
15.3	Indian Merchant Shipping Act and Rules Statutory surveys and certificates and preparations for the same	2	-	-
15.4	Classification Society surveys and certificates ' Preparations for the same	2	-	-
	<b>TOTAL</b>	<b>21</b>	<b>-</b>	<b>-</b>

**ANNEXURE 2**

NWKO (NCV) COURSE  
Forms of Certificate to be issued  
Name of the Institution  
Full postal address  
Phone, Fax, E-mail Address

**ATTENDANCE CERTIFICATE**

This is to certify that Mr. \_\_\_\_\_,  
 Date of birth \_\_\_\_\_ C.D.C. No.\* \_\_\_\_\_ P.P. No: \_\_\_\_\_ of  
 (issuing country) \_\_\_\_\_ Indian National Database of seafarers  
 (INDos) No: \_\_\_\_\_ was a student of this college for the NWKO (NCV)  
 Course from \_\_\_\_\_ to \_\_\_\_\_.

**His attendance during the above period and his performance in Internal Assessment Tests was satisfactory.**

His name is at Sr. No. \_\_\_\_\_ in the consolidated list of students of this course sent to the Chief Examiner of Masters and Mates, MMD Mumbai, MMD Calcutta and MMD Chennai, vide letter No. \_\_\_\_\_ dated \_\_\_\_\_.

Signature of Student	Date of issue and seal of institute	Signature & name of Course Officer/HOD	Signature & name of Head of the Institution or Authorized person

\* Indian Nationals must fill in only Indian C.D.C. No.

### ANNEXURE '3

#### **LIBRARY BOOKS, PUBLICATIONS, ETC. TO INCLUDE:**

1. STCW'95
2. IMO Model Course 7.01
3. Solas 1974
4. Marpol 73/78
5. IMO Load Line Rules 1966
6. IMO LSA Code
7. Colregs 1972
8. IAMSAR Vol III
9. ICS Bridge Procedures Guide
10. The Shiphandler's Guide By R.W. Rowe
11. Code Of Safe Practices For Merchant Seamen
12. DGS Orders, Circulars And MS Notices
13. META Manual Vol. I And II
14. International Safety Guide For Oil Tankers & Terminals (ISGOTT)
15. Admiralty Manual Of Seamanship
16. Admiralty Manual of Navigation
17. The Theory & Practice of Seamanship By Danton
18. Nautical Watchkeeping By Capt. H. Subramaniam
19. Ship Board Operations By H.I. Lavery
20. Stability, Trim and Cargo Calculations on MV Hindship And Oil Tankers by Joseph Aand Rewari
21. Ship Stability Volumes I, II & III by Capt. H. Subramaniam
22. Ship Stability By D.R. Derret
23. Merchant Ship Construction By D.A. Taylor
24. Ship Construction By D.J. Evers
25. Ship Construction Notes By Kemp and Young

26. Ship Construction By Capt. Edrich Fernandes
27. Safety, Emergency And Environmental Protection By Errol Fernandes
28. Practical Navigation By Capt. H. Subramaniam
29. Shipborne Radar & ARPA By Capt. H. Subramaniam
30. Arpa By A. Bole
31. Radar & Electronic Navigation By G.J. Sonnenberg
32. Bridge Equipment By Edrich Fernandes
33. Ship's Magnetism & Magnetic Compass By Merrifield
34. Ship's Magnetic Compass By Joseph & Rewari
35. Marine Gyro Compass By Frost & Grant
36. Bridge Equipment By Capt. A. G. Bhatia
37. Marine Meteorology By Capt H. Subramaniam
38. Basic Marine Engine Reeds Series
39. Introduction to Marine Engineering By D.A. Taylor
40. Engineering Knowledge for Deck Officers by J K Dhar
41. Business And Law for the Shipmaster By F.N. Hopkins
42. Indian Merchant Shipping Act

**TECHNICAL EQUIPMENT TO INCLUDE:**

1. Magnetic Compass in a Binnacle with correctors
2. Gyro Compass (Not necessarily operational)
3. Marine sextant.