

Guidelines - Degree Courses for Deck Cadets

Training Circular No. 4 of 2005

No:11-TR(38)/2004

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Subject: Guidelines - Degree Courses for Deck Cadets

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 others provided training facilities that were world class. In order to bring about uniformity of training, amenities and equipment provided by all training institutes the 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. Comments received were considered to the earliest possible.

The final guidelines for Course is attached herewith. In keeping with Government policy, the guidelines have been made in as transparent manner as practicable.

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

The above guidelines shall come into force w.e.f. 01.01.2005.

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

MANDATORY GUIDELINES FOR TRAINING INSTITUTES FOR OBTAINING APPROVAL FROM DIRECTORATE GENERAL OF SHIPPING TO CONDUCT OF Degree Coures for Deck Cadets

To avoid unnecessary repetition, reference has been made herein to

[DGS Order no: 1 of 2003](#) (Guidelines for the conduct of Pre-Sea Training Courses for the Merchant Navy) wherever appropriate.

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DEGREE COURSES FOR DECK CADETS

1. PREAMBLE

Safety and efficiency of ships are dependent upon the professional competence and dedication to duty, of the seafarers on board them. Hence maritime education and training, and within that, pre-sea training, is of vital importance. With this in mind, the course of training in India is compulsorily residential with workshop training, boatwork, computer operation, team games, swimming, physical training, parade and a host of other extra-curricular activities. Students successfully completing this course should have the required standard of knowledge, communication skills, competence, cheerful obedience to orders of superiors, team spirit, leadership and other seaman-like qualities. All institutes that conduct, or intend to conduct degree courses for deck cadets should follow these guidelines in letter and spirit

2. BASIC DETAILS OF THE COURSE

1. Aims:

To provide professionally competent graduate nautical officers, with all round proficiency and dedication to the profession, for the operation of merchant ships.

2. Objectives:

To provide a course that balances the requirements of university-type graduate education with the technical expertise necessary for the safe and efficient operation of merchant ships.

3. Scope

These guidelines are for institutes that conduct or seek approval of the Directorate General of Shipping (DGS) to conduct university-affiliated degree courses in order that the graduates who pass out are eligible to go out to sea on merchant ships and subsequently become officers in the nautical (deck) department.

4. Application:

Compliance with these guidelines shall be mandatory for all institutes from the academic [session of 2004].

3. QUALIFICATION & ELIGIBILITY OF STUDENTS

1. Entry Standards:

3.1.1. Academic standards: Pass in HSC / ISC (10+2) with Mathematics, Physics and Chemistry with a PCM average of not less than 60%. Candidates selected through IIT (JEE) competition examination need not comply with above criteria provided this is done in prior consultation with DGS.

3.1.2. Age limits on the date of commencement of training: 20 years on the date of commencement of training.

3.1.3. Physical standards: As per M.S (Medical Examination for seafarers) Rules 2000 as amended from time to time.

3.1.4. Eyesight standard: 6/6 in each eye without visual aids, Normal colour vision.

2. Required Attendance:

Considering that the course is residential, attendance shall normally be 100%. However, 90% and above is acceptable. In exceptional cases, the course in charge may accept attendance of 75% and above, if he is satisfied that the reason for shortfall is genuine and that the cadet's performance in the course has been good. Such reasons shall be recorded and be available for inspection.

3. Course intake limitations:

The sanctioned number of cadets shall be 40 per class and in multiples of 40 thereafter. The approval for total number of intake of cadets shall be granted by DGS depending on infrastructure. In addition, cadets who fail may be allowed to sit in as repeaters provided there is sufficient place in the classroom and hostel.

4. INFRASTRUCTURE REQUIREMENT

1. Physical requirements

for classrooms, black / white boards, overhead projector, screen, notice board, library, faculty rooms, study environment, teaching equipment, etc. are to be provided as per DGS Order no: 1 of 2003.

An auditorium or a hall capable of accommodating 150 persons @ 1m² per person should be provided and:

4.2.1. A raised stage of reasonable size is to be provided.

4.2.2. The hall is so located so as to be reasonably free from undesirable external noise.

4.2.3. Curtains are provided to reduce external noise and darken the hall for visual displays.

4.2.4. A screen of suitable size, commensurate with the capacity of the hall, for movies, LCD projector displays, etc. is to be provided.

4.2.5. The flooring, walls, roof, etc are of a high standard of construction and appearance.

4.2.6. Chairs for the audience, appropriate for use in a function involving eminent visitors, are to be available.

4.2.7. The institute's dining hall can be used for this purpose provided:

4.2.7.1. It is of the required area.

4.2.7.2. The dining tables can be conveniently taken out and stored in a designated space.

4.2.7.3. There are proper exhaust fans to prevent odour from the galley from entering the hall.

4.2.7.4. The adjoining toilets are kept up to a high level of appearance, cleanliness and hygiene, considering that eminent persons would be attending functions.

The requirement of an auditorium/hall within the campus can be dispensed with if a suitable hall/auditorium is available on hire within a reasonable distance

2. Chartroom

Facilities shall be available for Chartwork. Chart table shall be approximately 1.15 m x 0.8 m and the minimum space in the classroom shall be at the rate of 2m² per student. The facilities for Chartwork shall be for not less than 40 students at a time.

3. Navigation laboratory

of suitable area, with equipment as given in Annexure 6.

4. Seamanship laboratory

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given in Annexure 6.

5. Carpentry workshop

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given in Annexure 6.

6. Plumbing workshop

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given in Annexure 6

7. Machine workshop

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given Annexure 6

8. Electrical workshop

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given in Annexure 6

9. Hotwork workshop

of suitable area, commensurate with the number of cadets under training at a time, with equipment as given in Annexure 6

10. Videos/CDs/DVDs

On various topics including Bridge watch keeping procedure and routine, Passage planning, Dry docking, Ship board safety, ISM code, MARPOL, IGS, GMDSS, SOLAS, ISPS Code, Anchors and cables, Hot work.

11. Computer programmes

(PC based) on various topics e.g ROR, navigation, etc

5. COURSE DETAILS

1. Course duration

The course shall be of not less than three academic year's duration in keeping with the requirements of the affiliating university.

2. Course Outline

The course outline and the distribution of hours for each topic/activity is as per Annexures 3 & 4. Variations in the academic content and overall distribution are permitted to suit the requirements of affiliating universities. However, the course content of nautical subjects shall be not lower than that in Annexure 4.

3. The curriculum should include the activities contained in Annexures 3. A proper record of actual dates, times and duration spent on each of these activities should be maintained, especially where the facility has been outsourced, and shown to the members of the academic council during inspections. When in doubt, the Academic Council may crosscheck with the outsourced agency.

6. FACULTY REQUIREMENT

1. Qualifications and experience of course in charge:

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

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 experience as a faculty member of at least one year at Pre-Sea Cadet (degree Courses) or Competency Courses

or

at least 2 yrs experience as Chief Officer and two years experience as faculty member at Pre-Sea Cadet degree courses or Competency Courses

or

Holder of Extra Master / M.Sc (MET) qualification

2. Qualifications and experience of faculty members:

6.2.1. Certificate of Competency, as Master of a Foreign Going Ship (for Nautical subjects) or MEO Class I (for Engineering subjects) issued or recognised by the Government of India,

and

6.2.2. At least 5 years service on Merchant ships including at least one year at Management level.

3. Qualifications and experience of faculty members (Academic subjects)

As per the applicable recruitment rules of the affiliating university or UGC guidelines for the recruitment of the lecturers.

4. Qualifications and experience of Instructors

6.4.1. Held a rank not lower than Petty Officer in the Indian Navy or Bosun (Serang) on a merchant ship

6.4.2. PT instructor should have PTI qualification.

6.4.3. Ex-Navy instructors for Seamanship must have Seamanship Instructors qualifications.

6.4.4. For Machine Workshop, Fitters who have five years sea experience on merchant ships or ex-Navy instructors with qualification as Mechanician.

6.4.5. Instructors for skills such as Carpentry, Plumbing, and Machining and Electrical repairs possess appropriate trade certificates from ITI or equivalent acceptable to DGS.

6.4.6. Instructors for carpentry and plumbing may be persons who have five years sea experience on merchant ships as Petty Officer (maintenance).

6.4.7. Instructors for Electrical Workshop may be persons who have experience on merchant ships of one year as Electrical Officer or five years as Electrician/wireman.

6.4.8. Instructors already in employment of DGS-approved pre-sea training institutes for three years or more on the date these guidelines become applicable, may continue to teach the same subjects/topics even if they do not possess the above qualifications.

5. Faculty Strength

6.5.1. The number of cadets in a lecture class shall not exceed 40. < /p>

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

6.5.3. At least 50% of the faculty in each category must be on full-time employment of the institute

6. Instructor strength

This will depend on:

6.6.1 One course co-ordinator with qualification & experience indicated under Para 6.1

6.6.2 Two faculty members on regular (full time) employment. One such faculty member to have Nautical qualification / experience and other with Engineering qualification experience as indicated under Para 6.2

6.6.3 Five instructors on regular (full time) employment for PT, Seamanship, Machine Workshop, Carpentry/ Plumbing and Electrical workshop with qualification/ experience as indicated under Para 6.

6.6.4 Institutes may employ additional faculty on visiting basis. However, qualifications/ experience of such faculty will be similar to those indicated in these guidelines for regular faculty.

7. DUTY OFFICER & DUTY INSTRUCTOR

There must be at least one Nautical Officer (Master Mariner) or Engineer Officer (MEO Class I if keeping duties in rotation), and one instructor designated as on duty each day on the campus at all times during the course period.

8. HOURS PER WEEK

Classroom lectures, practicals and skills (workshops.etc) shall be at 36 hours a week.

9. HOLIDAYS

9.1.1. Sundays shall be holidays.

9.1.2. Independence Day and Republic day shall be compulsory holidays.

9.1.3. All government holidays, applicable to the state in which the institution is situated, shall normally be observed.

10. UNIFORMS

1. Uniforms for faculty members

10.1. For Faculty Members: Shall be as listed in Annexure 1.

10.2. Uniforms for cadets: Cadets must wear uniform at all times during training activities ceremonial kit, day kit, games kit, boiler suits, night suits, swimming kit, etc. The list of uniforms and other accessories that each cadet must possess while under training in the institute is given in Annexure 2.

10.3. Uniforms for other staff: The institute may prescribe suitable uniform to be worn by non-teaching staff.

2. Uniforms for cadets

3. Uniforms for others

11. QUALITY STANDARDS

As per DGS Order no: 1 of 2003.

12. ASSESSMENT

The institute shall carry out minimum one assessment at end of each semester.

13. INSPECTIONS

As per DGS order no: 1 of 2003.

14. COST OF INSPECTIONS

As per DGS order no: 1 of 2003.

15. FEES TO GOVT

As per DGS order no: 1 of 2003.

ANNEXURE - 1

Uniforms for faculty members

1. Epaulettes

Instructor: One Stripe.

Senior Instructor: Two stripes.

Nautical Officer (Master Mariner): A diamond and four stripes.

Engineer Officer (MEO Class I): A diamond and four stripes with purple in between

Senior Nautical Officer: A diamond and a broad stripe.

Next below course in charge (Master Mariner) Title: Chief Officer: A diamond, one stripe and a broad stripe.

Course in charge (Master Mariner) Title: Captain Superintendent: A diamond, two stripes and a broad stripe.

Note 1: Each stripe to be approximately 10 mm broad. The broad stripe to be approximately 45 mm broad.

Note 2: The diamond shape on the epaulette is only for an officer who possesses a Certificate of Competency granted or duly recognised by the Directorate General of Shipping.

2. Caps

All faculty members: White peak Cap.

Chief Officer, Senior Nautical Officer: White peak cap with one row of golden laurels.

Captain Superintendent: White peak cap with two rows of golden laurels.

3. Uniform

White half-sleeve shirt with epaulettes, white trousers, white belt, white socks and black shoes.

In cold weather, black trousers, black belt and black socks may be substituted for white.

White full-sleeve shirt may be worn after sunset in mosquito prone areas.

ANNEXURE - 2

List of uniform items & accessories for deck cadets of degree courses

	Nos.
1 White terycot trousers	2
2 Black terycot trousers	2
3 White terycot shorts	4
4 White terycot half-sleeve shirts with two front pockets and holes for epaulettes	4

5	White terycot shirts full sleeves with single front pocket	2
6	Blue terycot shorts	2
7	Blue sports shirts cotton (Gym rig)	2
8	White sports shirts - cotton (Gym rig)	2
9	White Boiler suits Long sleeves (Drill)	2
10	Black terycot ties - 5 cm wide (same colour & cloth as item 2) with yellow monogram of the institution.	1
11	Soft peak-cap (navy blue colour) with monogram of the institute (not for Sikhs)	1
12	Pugree - white cotton (for Sikhs only)	2
13	Zari badge for use with pugree (for Sikhs only)	1
14	Pugree - blue cotton (for Sikhs only)	2
15	White webbed - nylon belt	1
16	Epaulettes with full stripes	1
17	Soiled linen bags (80 cm X 66 cm)	2
18	White nylon stockings	2 pairs
19	Blue cotton stockings	2 pairs
20	Black nylon socks	2 pairs
21	Clasp knife (Boy-scout type)	1
22	Leather belt with a ring for clasp knife	1
23	Night suits (Pyjama & top)	2
24	White handkerchief (40 cm X 40 cm)	6
25	Swimming trunks	1
26	Coat hangers (Plastic) - 45 cm with cross bar	6
27	Black shoes	1 pair
28	Keds (ordinary canvas shoes)	1 pair
29	Black safety shoes	1 pair
30	Safety gloves	1 pair
31	Calculator (Non-programmable & Non-scientific)	1
32	Geometrical instrument box	1
33	Exercise books - No. of books, their sizes & No. of pages in each book to be specified by the institute.	

Annexure 3

CURRICULUM SHOULD INCLUDE THE FOLLOWING ACTIVITIES:

A proper record of actual dates, times and duration spent on each of the following activities should be maintained, especially where the facility has been outsourced, and shown to the members of the academic council during inspections. When in doubt, crosschecking with the outsourced agency may be done.

1. PRACTICAL SEAMANSHIP

GENERAL

Lectures 75 hrs; Practicals: 34 hrs; Total: 109 hours per year

Demonstrate and conduct practice on the use of various types of cordage, fibre and wire ropes used on ships.

Demonstrate and conduct practice on various types of whippings.

Demonstrate & conduct practice on various types of Knots, Bends & Hitches.

Demonstrate & conduct practice on types of splices on fibre and wire ropes.

Demonstrate the use of bulldog grips and bottlescrews/turnbuckles in joining wires.

& Explain the care & maintenance of fibre and wire ropes including uncoiling, coiling, stowing, etc.

Conduct practical exercises on the use of blocks, snatch blocks and the differential pulley (chain blocks).

Different types of tackles & purchases and the power gained in each case.

Conduct practical exercises on the maintenance of various types of blocks, tackles, shackles and bottle-screws/turnbuckles, including opening, greasing, etc.

Explain mooring arrangements. Explain the use of a mooring shackle.

Conduct practical exercises on throwing heaving lines, use of rope & chain stoppers, mooring shackle and handling of mooring ropes. Use of slip-ropes.

Explain Anchor Work. Explain the parts of a windlass.

Explain the following terms in connection with anchor work: Cable, Link, Swivel, Joining Shackle, Shackle as a term of length, Bitter End.

Parts of a stockless anchor.

Demonstrate the ability to use a sledgehammer.

Conduct practical exercises on opening a lug and a lugless shackle.

Explain the uses of an anchor, how it is dropped, hoisted and secured.

Demonstrate the ability to climb a ship's mast

Demonstrate ability in rope climbing.

Types of paints, painting procedures and defects

Conduct practical exercises on chipping and painting. Demonstrate all tools and gear available for the maintenance steel parts of a ship.

Explain the various cargo gear used. Explain SWL and Breaking Stress. Conduct simple exercises on cargo gear rigging.

Conduct practical exercises on rigging and climbing pilot ladders and Jacob's ladders. Maintenance of the same.

Demonstrate the use of the bosun's chair.

Demonstrate the use of overside staging for shipside maintenance.

Demonstrate the use of the safety belt and safety harness during the earlier two operations.

Explain the methods of dealing with an oil spill on deck.

Explain the plugging of scuppers during bunkering, loading and discharging of oil cargo.

Explain the use and construction of a cement box to stop leaks.

Explain Magnetic compass points.

Explain steering and helm orders.

2. BOATWORK

Lectures Nil; Practicals 40 hrs; Total 40 hours per year

Explain the necessity to muster and ensure that each member of the boat crew wears boiler suit, safety shoes, helmet & life jacket.

The importance of checking that life jackets are worn correctly.

Explain the purpose of gravity davits and other arrangements for launching a lifeboat.

Practice procedure for preparation and launching.

Demonstrate ability to take charge, muster the crew, check life jackets, allot duties and give instructions for launching. To ensure that all crew carryout their duties correctly.

Practice rowing with proper co-ordination.

Practice and then demonstrate the ability to pick up a buoy (representing a man overboard).

3. SHIP VISITS

<h3> Lectures Nil; Practicals 30 hrs; Total 30 hours per year

Practical familiarisation visits to merchant ships

4. WORKSHOP PRACTICALS -

Theory 75 hours Practical : 25 hrs Total 100 hrs per year

Carpentry workshop: Various types of tools and their uses e.g., nails, wood screws, screwdrivers, hammers (including claw, ball-pane, sledge, mallet), crowbars, saws, chisels, wood files, drills, vice, clamps, jack-planes, etc. Repairs to fibreglass surfaces such as boats, etc. Uses of various adhesives in joining of materials.

Plumbing workshop: Proper use of tools - spanners, wrenches, hacksaws, files, etc. The use of T-joints, bends and couplings in pipelines. Dismantling and joining various types of pipelines. Repair of water taps. Types of pipes, pipelines, their sizes, joints, cutting of simple gaskets/packing for pipe flanges, treatment leaks, use of various sealants for stopping small leaks in pipelines, pipe clamps, cutting of threads in pipelines, clearing of choked water pipelines.

Machine workshop: Familiarisation with, and proper use of, various tools e.g., open spanners, ring spanners, socket spanners, ratchet spanners, torsion spanners, Allen keys, screw drivers, files, hammers, chisels, punches, reamers, vice, taps and dies, etc. Special practice to be given on use of a sledgehammer. Types of nuts and bolts, studs; methods of freeing rusted nuts and bolts; proper use of the grinding machine, drilling machine (portable and mounted); use of coolants such as water, oil, etc., during drilling. Use of measuring devices - feeler gauges, callipers, screw gauges, etc. Overhauling of gate valves, butterfly valves and hydrants. The importance of lubricating oil and grease in reducing friction in machines.

Electrical workshop: Precautions when using electrical appliances; fuses and circuit breakers and their uses; danger of loose or improper connections; use of insulated hand tools, insulation tape, insulated

footwear; danger of wet surfaces; proper connections (line, neuter and earth) in various joints. Types and specifications of electrical wire when making indents for purchase. Theory & practical of soldering.

Hotwork workshop: Basic theory and practical experience of gas cutting, gas welding and electric arc welding. Gas heating to free rusted nuts and bolts. The proper precautions to be taken during each of these processes.

BASIC COMPUTER TRAINING

Lectures 75; Practicals 25 hrs; Total 100 hours in 2nd year only

The cadet should learn & demonstrate his proficiency in the operation of the following:

Introduction to Computers and Windows (7 hours):

Handling the Computer and peripherals

Booting

Keyboard layout and functions of different keys

Proper shut down

Windows Operating System

Desktop features

Managing files and folders

Opening files and folders

Finding files and folders

Renaming files and folders

Deleting files and folders

Handling of Windows

Help

Shutting down the computer

MS Word (5 hours)

MS Excel (5 hours)

MS Access (5 hours)

MS Power Point (5 hours)

Proficiency in the above four programmes should include opening/ creating files/worksheets/databases/presentations, recording, editing, transferring, printing out, closing files, etc.

5. GENERAL

Parade training

Physical training

Rope climbing

Swimming

Athletics

Outdoor games such as football, volleyball, etc

Indoor games

Extra curricular activities to develop officer like qualities such as Debating, Dramatics, etc.

Educational trips to shipping related organisations such as IRS, NIO, Goa, NSDR, VIZAG etc

FAMILIARISATION WITH SHIPBOARD EQUIPMENT

Instructional visits to GMDSS Simulator.

Instructional visits to Radar & ARPA Simulator.

Annexure 4

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GRR NO	GRR NO	TITLE OF THE GROUP SUBJECT	DUR. OF EXAM		MAX. MARKS			PAS MARKS		PERIODS FOR YEAR		
			TH.	PR	TH.	PR	TOTAL	TH.	PR.	TH.	PR.	TOTAL
I.												
		SCHOLASTIC GROUP										
	1.	ENGLISH & COMMUNICATION SKILLS	3	3	75	25	100	30	10	75	25	100
2.	APPLIED MATHEMATICS PAPER - I	3	-	100	-	100	40	-	100	-	100	
3.	APPLIED MATHEMATICS PAPER - II	3	-	100	-	100	40	-	100	-	100	
4	NAUTICAL PHYSICS & ELECTRONICS PAPER - I	3	3	75	25	100	30	10	75	25	100	
5.	NAUTICAL PHYSICS & ELECTRONICS PAPER - II	3	3	75	25	100	30	10	75	25	100	
6.	CORE GROUP NAVIGATION PAPER I (A) PRINCIPLES OF NAVIGATION (30T) (B)	3	3	75	25	100	52	18	75	25	100	

	PRACTICAL NAVIGATION (45 T + 25 P)											
7.	VOYAGE PLANNING & COLLISION PREVENTION PAPER I (A) VOYAGE PLANNING (25 T + 25 P) (B) COLLISION PREVENTION (25 T + 25 P)	3	3	50	50	100	35	35	50	50	100	
8.	SHIP OPERATION TECHNOLOGY PAPER -I CARGO WORK & MARINE COMMUNICATION	3	3	75	25	100	45	15	75	25	100	
9.	(A) CARGO WORK (50T) (B) MARINE COMMUNICATION (25 T + 25 P)	3	3	75	25	100	45	15	75	25	100	
10.	(NAVAL ARCHITECTURE PAPER ? I (A) SHIP STABILITY (50 T) (B) SHIP CONSTRUCTION (50 T)	3	-	100	-	100	60	-	100	-	100	
11.	(NAVAL ARCHITECTURE PAPER ? I (A) SHIP STABILITY (50 T) (B) SHIP CONSTRUCTION (50 T)	3	-	100	-	100	60	-	100	-	100	
	APPLIED GROUP											
11	ENVIRONMENTAL SCIENCE PAPER - I	3	3	75	25	100	30	10	75	25	100	
12	MARINE ENGINEERING & CONTROL SYSTEMS PAPER ? I	3	3	75	25	100	30	10	75	25	100	

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[illegible]

		NAVIGATION PAPER ? III (A) PRINCIPLES OF NAVIGATION (30 T) (B) PRACTICAL NAVIGATION (45 T + 25 P)	3	3	75	25	100	30	10	75	25	120
2		VOYAGE PLANNING & COLLISION PREVENTION PAPER ? III (A) VOYAGE PLANNING (25 T + 25 P) (B) COLLISION PREVENTION (25 T + 25 P))	3	3	50	50	100	35	35	60	60	120
3.		NAVIGATION PAPER ? IV	3	3	75	25	100	45	15	75	25	120
4.		SHIP OPERATION TECHNOLOGY PAPER ? III (A) CARGO WORK (60 T) (B) MARINE COMMUNICATION (15 T + 25 P)	3	3	75	25	100	45	15	75	25	120
5.		SHIP OPERATION TECHNOLOGY PAPER ? IV (A) SEAMANSHIP & WATCHKEEPING (60 T + 25 P) (B) MAINTENANCE (15 T)	3	3	75	25	100	45	15	75	25	120
6.		NAVAL ARCHITECTURE PAPER ? III (A) SHIP STABILITY (50 T) (B) SHIP CONSTRUCTION (50 T)	3	-	100	-	100	-	100	60	-	120
2	APPLIED GROUP											
7.		SHIPPING MANAGEMENT (A) MARINE MANAGEMENT (50 T) (B) MARITIME COMMERCE (50 T)	3	-	100	-	100	-	100	60	-	120
8.		MARITIME LAW	3	-	100	-	100	-	100	60	-	120
9	ENVIRONMENTAL SCIENCE PAPER ? III (A) METEOROLOGY	3	3	75	25	100	30	10	75	25	120	

	& OCEANOGRAPHY (50 T + 25 P) (B) ENVIRONMENTAL PROTECTION (25 T)											
10	MARINE ENGINEERING & CONTROL SYSTEMS PAPER ? III	3	3	75	25	100	30	10	75	25	120	

Annexure 5- Format of passing out certificate

Annexure 6

List of equipment for laboratories & workshops.

Navigation laboratory equipment to include:

1. Layout of bridge with dummy instrument panels including steering wheel, Echo Sounder, etc.
2. Working GPS receiver
3. Steering Simulator
4. Sextant
5. Chronometer
6. Wet card magnetic compass in a binnacle
7. Dummy Gyro Compass with repeaters
8. Azimuth Circle
9. Binoculars (7 x 50)
10. Telescope
11. Some Indian and British Charts
12. Parallel Rulers
13. Set squares
14. Drawing compass and dividers
15. Aneroid barometer
16. Mason's hygrometer in a Stevenson's screen
17. Whirling Psychrometer
18. Glass-mounted or wall-mounted device for simulated Load-line and reading of the Draft
19. Beaufort scale wind and State of Sea Chart
20. International cloud atlas
21. Ship's Weather Code
22. A set of recent (not necessarily current) nautical publications carried on ships.
23. Various plans of ships as supplied by shipyards.
24. Ship's oil record book
25. Ship's garbage management plan and garbage record book.
26. Ship's ballast water management plan
27. Register of lifting appliances & loose gear
28. Deck logbook
29. Meteorology record book
30. Chronometer logbook.
31. Safety placards to be displayed at suitable places.
32. Line throwing apparatus
33. MOB Marker
34. Navigation Lights
35. International Code Flags
- 36.

37. International Code of Signals
38. Daylight signalling lamp
39. Morse key for signal practice class

Seamanship laboratory equipment to include:

1. Anchor work: Lugged & lug-less joining shackles. Sledgehammer, lead pellets, spile pin, anchor shackle rod punch. Models or photographs or slides of various types of anchors, markings of anchor cable.
2. Boatwork: Already covered by DGS Rule no: 1 of 2003.
3. Rigging: Manila ropes (various sizes), Synthetic ropes (various types & sizes), Steel wire ropes (various types & sizes), Seizing twine and seizing wire, Heaving line, Rope and chain stoppers, Single, double & triple sheave blocks, Snatch block, chain block; Bottle screws and turnbuckles, Bulldog grips, Hand leadline, Marlin spikes, Wooden spikes, Pilot ladder rigged up for practice, Jacob's (coolie) ladder rigged up for practice, Rope ready for rope climbing.
4. Lifting gear: Photographs or slides or models of various types of cargo gear Derricks, Velle derricks, Jumbo derricks, Stulken derricks, cranes, cargo slings, cargo hooks, etc.
5. Maintenance: Chipping hammers, scrapers and wire brushes, Paint brushes (various sizes and types), De-scaling (chipping) machine, Bosun's chair, Over side stage, Sounding rod.

Carpentry workshop equipment to include:

1. Bench vices
2. Crow bars
3. Saws straight, hack and fret
4. Hammers claw, ball-pein, sledge, mallet, etc
5. Various wood chisels
6. Various wood files
7. Nail extractors
8. Breast braces and other clamps
9. Hand drilling machine with hand drill bits
10. Masonry punches
11. Portable electric drill and its bits including masonry bits
12. Various types and sizes of screw drivers
13. Wood screw and nails
14. Jackplane.

Plumbing workshop equipment to include: Spanners, wrenches, Stilson wrench, hacksaws, metal files, Teflon thread tape, water taps with washers, gasket material, plumbers vice, taps & dies for cutting threads on pipes, etc.

Machine workshop equipment to include:

1. Grinding machine
2. Drilling machine (mounted)
3. Electric drill (portable)
4. Various spanners (open, ring, socket, ratchet, torsion, Allen keys, etc)
5. Various types and sizes of hammers (claw, ball-pane, sledge, etc.)
6. Various types and sizes of screwdrivers, files, chisels, punches, reamers, hacksaws, taps & dies, etc.
7. Precision measuring devices such as Vernier callipers, screw gauges, feeler gauges, etc.
8. Spouted oil can, hand-operated grease gun.

Electrical workshop equipment to include:

1. Insulated tools normally used by electricians
2. Various types of insulation tape
3. Multimeters and meggers

4. Fuses and circuit breakers
5. Various types of electrical connections
6. Soldering irons, solder, flux.
7. Hotwork workshop equipment to include:
8. Oxy-acetylene gas cutting/welding apparatus and its accessories
9. Electric arc welding machine and its accessories

Adequate metal pieces for Hotwork practice of cutting and weldi