तार : डीजीशिप
Telegram : DEGESHIP

भारत सरकार
GOVERNMENT OF INDIA
जल भूतल परिवहन मंत्रालय
MINISTRY OF SURFACE TRANSPORT
नौवहन महानिदेशालय
DIRECTORATE GENERAL OF SHIPPING
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No. 3-TR(102)/98

Date 27.4.2001

To,

1. All Approved Training Institutes (Pre-Sea Deck)
2. All Academic Councils.

2 MAY 2001

Subject- Norms for the approval of Institutes for imparting 3 ½ months pre-sea training for Deck Cadets.

Sir,

I am directed to forward herewith a copy of Norms for the approval of institutes for imparting 3 ½ months pre-sea training for Deck Cadets. You are requested to comply the norms strictly.

Yours faithfully,

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

Encl: As above

Copy to:-

1. N.T. Branch
2. Engg. Branch
3. Guard File
4. PP to ST.DDG

Sr. Dy. Director General of Shipping

sona-A

Norms for the approval of Institutes for imparting three-&-a-half month pre-sea training for Deck Cadets

1. Objectives:

Trainees in India come from families varying in social, cultural, geographic, linguistic and economic backgrounds. By a regimented, disciplined training schedule placing adequate emphasis on classroom and outdoor activities such as parade training, physical training, swimming, boat work, outdoor games, etc., each trainee is expected to be fully re-oriented to be suitable for the sea-faring profession with regard to cheerful obedience to lawful orders of superiors, team spirit, leadership and other officer-like qualities. Trainees passing out of approved institutes would thus tend to be of a uniform standard in knowledge, competence and code of behaviour. Hence only institutes which fulfil these guidelines will be approved to impart pre-sea training for deck cadets of the merchant navy.

2. Campus

The institute must have an independent campus in which all activities should take place to the exclusion of outsiders. Institutes which have already been approved in the past, and are in existence on 31st July 1998, may, at the discretion of the Chief Examiner of Maters and Mates, be given reasonable time to shift to such a campus. Such period of grace would be decided on the merits of each case separately. Where on-campus facilities for boat work, swimming, workshops and computer training do not exist, tie-up with suitable outside agencies may be permitted.

3. Residential facilities

The training shall be fully residential with appropriate catering facilities. The hostel shall be within the campus, well ventilated with adequate cupboards for hanging uniforms & storing clothes and books for study. Adequate storage space shall be provided for cadets to store their baggage/luggage. The toilet facilities in the hostel shall be adequate – in the ratio of one wash basin, shower and w.c. for every five cadets. As far as possible, different utilities (wash basin, shower and w.c) shall not be clubbed into one room such that if one cadet is using the w.c., he would be denying other cadets the use of a shower or wash basin.

4. Classroom sizes:

The carpet area requirements for classrooms will depend upon the number and type of seating arrangement for cadets. A raised platform with a table and chair must be provided for the teacher. Each cadet shall be provided with a separate chair and table. The size of the classroom for various numbers of cadets is given below:

No. of students	Carpet area of room
20	Not less than 30 m^2
40	Not less than 50 m^2
Between 20 & 40	Interpolate between 30 & 50 m^2

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 $2m^2$ per student. The facilities for Chartwork shall be at least 50% of the sanctioned cadet strength.

5. **A dedicated library-cum reading room:** of not less than 50 m^2 shall be provided, adequately stocked and furnished. Newspapers and magazines (technical and general) shall be provided for cadets' use.
6. **A student activity centre:** of suitable area, commensurate with the number of cadets under training at a time, with provisions for indoor games, TV etc.
7. **A dispensary:** stocked with adequate supplies for rendering first aid.
8. **A seamanship laboratory:** of suitable area, adequately equipped, commensurate with the number of cadets under training at a time (refer to para 23).
9. **A computer laboratory:** of suitable area, adequately equipped, for making cadets proficient in the use of computers for day to day work (refer to para 24). Where on-campus facilities do not exist, tie-up with suitable outside agencies may be permitted.
10. **A carpentry workshop:** provided with a full range of wood-working tools as provided on merchant ships (refer to para 25).
11. **Plumbing workshop:** provided with appropriate plumbing tools (refer to para 26).
12. **Machine workshop**: provided with appropriate machines, tool and implements (refer to para 27).

13. **Electrical workshop**: provided with suitable tools, implements and appliances (refer to para 28).

14. **Hotwork workshop:** suitable fitted out for gas cutting/welding and electric arc welding practice (refer to para 29).

15. **Open space**: adequate for heaving the line, handling of hawsers, parade training, physical training, football, volley ball, etc.

16. **Swimming facilities:** The Institute shall have the facilities for imparting training in swimming. Where on-campus swimming facilities do not exist, tie-up with suitable outside agencies may be permitted.

17. **Boatwork training:** Facilities are necessary for practice in handling of boats under oars. Where on-campus facilities do not exist, tie-up with suitable outside agencies may be permitted.

18. **Drinking water:** Cold drinking water must be provided at adequate, appropriate locations on the campus.

19. **Teaching equipment:** Each classroom should have a black (or white) board, overhead projector and screen. The institute should have adequate audio-visual materials including TV's, video/CD players, appropriate video tapes/CD's, etc.

20. **General equipment to include:**

    20.1. World maps

    20.2. Models of ships

    20.3. Wall-mounted photographs of ships and ports

    20.4. Chronometer log book

    20.5. Mate's log book

    20.6. Meteorology log book

    20.7. Oil Record book

21. **Video cassettes/CD's to include:**

    21.1. Entry into enclosed spaces

    21.2. Use of breathing apparatus

    21.3. Pollution prevention

    21.4. Abandon ship

    21.5. Bridge watch keeping procedures and routine

22. Navigation equipment to include:

22.1. Sextant
22.2. Chronometer
22.3. Wet card magnetic compass in a binnacle
22.4. Gyro Compass with repeaters
22.5. Dummy steering wheel with helm indicator
22.6. Azimuth Circle
22.7. Binoculars (7 x 50)
22.8. Terrestrial telescope
22.9. Signalling lamp with mains and battery supply.
22.10. Indian and British Charts
22.11. Parallel Rulers
22.12. Set squares
22.13. Drawing compass and dividers
22.14. Aneroid barometer
22.15. Mason's hygrometer in a Stevenson's screen
22.16. Whirling Psychrometer
22.17. Beaufort scale wind and State of Sea Chart
22.18. International cloud atlas
22.19. Ship's Weather Code
22.20. A set of recent (not necessarily current) nautical publications carried on ships

23. Seamanship equipment to include:

23.1. A ship type mast, approximately 15 metres high, for practice in mast climbing.
23.2. Manila ropes [various sizes]
23.3. Synthetic ropes [various sizes]
23.4. Steel wire ropes [various sizes]
23.5. Seizing twine and seizing wire
23.6. Heaving lines
23.7. Rope and wire stoppers
23.8. Anchor shackle

23.9. Lugless shackle for anchor chain

23.10. Mooring shackle

23.11. Single, double and triple sheave blocks

23.12. Cargo block

23.13. Snatch block

23.14. Bottle screws and turn buckles

23.15. Bulldog grips

23.16. Differential pulley (chain block)

23.17. Chipping hammers, scrapers and wire brushes.

23.18. Paint brushes [various sizes and types]

23.19. Life-jackets and life-buoys of approved type

23.20. Set of dummy distress signals

23.21. Pilot ladder rigged up for practice

23.22. Jacob's (coolie) ladder rigged up for practice

23.23. Bosun's chair

23.24. Overside stage

23.25. A 36 mm manila rope rigged up for rope climbing

23.26. Safety belt

23.27. Safety harness

23.28. Marline spikes

23.29. Wooden spikes

23.30. Sounding rod

23.31. Sluice valve (about 30 cm diameter)

23.32. Butterfly valve (about 30 cm diameter)

23.33. Fabricated manhole and its cover.

23.34. Glass-mounted or wall-mounted device for simulated reading of the draft of ship in metres + centimetres and also in decimetres.

23.35. Various plans of ships

24. Computer equipment to include: at least six workstations provided with MS Office which includes Word, Excel, Access and PowerPoint programmes.

25. Carpentry work shop tools to include:

25.1. Bench vices

25.2. Crow bars

25.3. Saws – straight, hack and fret

25.4. Hammers – claw, ball-pane, sledge, mallet, etc.

25.5. Various wood Chisels

25.6. Various wood files

25.7. Nail extractors

25.8. Breast braces and other clamps

25.9. Hand drilling machine with hand drill bits

25.10. Masonry punches

25.11. Portable electric drill and its bits including masonry bits

25.12. Various types and sizes of screw drivers

25.13. Wood screw and nails

25.14. Jackplane

26. Plumbing work shop tools 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.

27. Machine work shop tools to include:

27.1. Grinding machine

27.2. Drilling machine (mounted)

27.3. Electric drill (portable)

27.4. Various spanners (open, ring, socket, ratchet, torsion, Allen keys, etc)

27.5. Various types and sizes of hammers (claw, ball-pane, sledge, etc.)

27.6. Various types and sizes of screwdrivers, files, chisels, punches, reamers, hacksaws, taps & dies, etc.

27.7. Precision measuring devices such as vernier callipers, screw gauges, feeler gauges, etc.

27.8. Spouted oil can, hand-operated grease gun.

28. Electrical work shop tools to include:

28.1. Insulated tools normally used by electricians

28.2. Various types of insulation tape

28.3. Multimeters and meggers

28.4. Fuses and circuit breakers

28.5. Various types of electrical connections

28.6. Soldering irons, solder, flux.

29. Hotwork work shop equipment to include:

29.1. Oxy-acetylene gas cutting/welding apparatus and its accessories

29.2. Electric arc welding machine and its accessories

29.3. Adequate metal pieces for Hotwork practice of cutting and welding.

30. Faculty strength:

30.1. The number of cadets in a lecture class shall not exceed 40.

30.2. 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.

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

30.4. The minimum faculty strength on full-time employment for a course shall be:

30.4.1. For up to 40 cadets per course: not less than TWO Master Mariners (excluding the course in-charge) and FIVE instructors (including one physical training instructor).

30.4.2. For 40 to 80 cadets per course: not less than THREE Master Mariners (excluding the course in-charge) and EIGHT instructors (including one physical training instructor).

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

31. Qualifications of faculty:

31.1. Only properly trained and qualified personnel should give training and instruction.

31.2. The course in charge should be a person possessing a Certificate of Competency as Extra Master or Master of a Foreign Going Ship granted or recognised by the Govt of India.

31.3. Academic faculty should possess at least a Masters degree in the subject taught by them.

31.4. Instructors should have a minimum of 10 years experience in their fields.

31.5. All faculty members shall have undergone an appropriate, approved 'Training of Trainers' course or equivalent accepted by the Directorate.

31.6. The upper age limit for full-time faculty members shall be 65 years.

32. Duty officer & duty instructor:

There must be at least one Master Mariner (or Chief Engineer if keeping duties in rotation), and preferably one instructor, on duty on the campus at all times during the course period.

33. Medical emergencies:

The Institute shall have the services of a doctor available at short notice and a tie up with medical facilities nearby in case of emergencies.

34. Course intake:

The number of trainees per course will depend on the infrastructure available in the institute such as area of the campus, sizes of classrooms, staff strength, teaching facilities, residential and catering facilities, teaching aids, laboratories, equipment, etc. The institute may make a self-assessment and propose the number of cadets per course but the decision of the Director General of Shipping will be final.

35. Admission standards:

35.1. Academic standards:

Pass in HSC/ISC (10+2) or equivalent with Mathematics, Physics and Chemistry as separate subjects with a PCM average of not less than 60%

OR

B.Sc. 55% average in Physics, Mathematics or Chemistry with Physics and Mathematics as individual subjects in the first and second years.

OR

B.E. or B.Tech degree from a college recognised by AICTE

35.2. Age limits on the date of commencement of training:

20 years for HSC/ISC, 22 years for B.Sc. and 23 years for B.E/ B.Tech.

35.3. Physical standards:

As per M.S. (Medical Examination for Seafarers) Rules in force.

35.4. Eyesight Standards:

6/6 in each eye without visual aids. Normal colour vision. Must have been tested by qualified ophthalmologist.

35.5. Communication skills:

Possesses adequate ability for communication in written English and spoken English and Hindi.

36. Verification of documents:

Before admission, all original documents in support of the applicant meeting the admission standards must be scrutinised by the head of the institute (or by his authorised representative). The responsibility for such scrutiny shall be that of the head of the institute. The institute must retain a photocopy of each such document for a period of not less than FIVE years. Since the originals are being sighted by the institution, the photocopies need not be attested.

37. Detailed teaching syllabus:

This is given in annexure 1.

38. Text books:

Each student must possess one copy of each of the textbooks listed in annexure 2.

39. Uniforms

39.1. Uniforms serve four main purposes:

39.1.1. Rich and poor cadets cannot be distinguished by their apparel.

39.1.2. Persons wearing uniform tend to behave correctly in public, as they are conspicuous by their uniform.

39.1.3. Proper hierarchy is established by the epaulettes worn. This is necessary in a pre-sea training establishment.

39.1.4. Laminated photo identity cards hanging on the right shirt-pocket (preferable to plastic name-tally plates) establish precise identity of the cadet.

39.2. It is therefore necessary for not only the cadets to wear uniform but also the faculty.

39.3. For faculty, uniform should be as given below:-

39.3.1. Epaulettes for faculty:

- Captain Superintendent (Master Mariner): A diamond, one stripe and a broad stripe.
- Chief Officer (Master Mariner): A diamond and a broad stripe.
- Nautical Officer (Master Mariner): A diamond and four stripes.
- Engineer Officer (MEO Class I): A diamond & four stripes with purple in between.
- Academic Officer: Three stripes with ship.
- Senior Instructor: Two stripes.
- Instructor: One 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 by the Directorate General of Shipping.

39.3.2. Caps for faculty:

- Captain Superintendent: Peak cap with two rows of golden laurels.
- Chief Officer: Peak cap with one row of golden laurels.
- Others: Peak Caps.

39.3.3. Uniform for faculty:

- 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.

39.4. 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 3.

40. Duration of the course:

The duration of the course shall be three-and-a-half months (fifteen weeks) inclusive of the four basic of Modular Courses and the terminal examination.

41. Course dates:

Courses may commence on the first working day of January each year and every alternate month thereafter. However, the total number of cadets under training, at any one time, shall not exceed the sanctioned strength for the pre-sea course at that institution.

42. Four basic modular courses:

42.1. The institute shall arrange for the cadets to undergo the following courses:

42.1.1. Personal Safety & Social Responsibilities (PSSR)

42.1.2. Personal Survival Techniques (PST)

42.1.3. Elementary First Aid (EFA)

42.1.4. Fire Prevention & Fire Fighting (FPFF).

42.2. The basic courses listed above must be courses approved by the Directorate General of Shipping.

42.3. A separate certificate must be issued to each cadet for each basic course.

43. INDos number:

Within three weeks of commencement of the course, the head of the institution shall send a list of cadets, in a prescribed format, to the Principal, LBS College of Advanced Maritime Studies and Research (LBSCAMSAR), Mumbai. The Principal shall allot a distinctive permanent Indian National Database of seafarers (INDos) number to each cadet and communicate the same to the institution. The INDos number should be stated in all maritime certificates and documents issued in India to that cadet during his/her lifetime.

44. Training in general etiquette:

Adequate training must be given in general behaviour, code of conduct, punctuality, feed back on instructions carried out, dress code, speaking on telephone and VHF, table manners, etc.

45. Alcohol, tobacco and drugs policy:

Abstinence from alcohol, tobacco and drugs (except medicinal drugs specifically prescribed for a cadet to cure a current ailment) must be strictly enforced.

46. Evaluation and monitoring:

The Institute shall have in place a system for continuous evaluation during the course of training to ensure that the candidates have achieved the desired level of skills as envisaged in STCW '95.

47. Final examination:

47.1. Towards the end of each course, there will be a final examination consisting of both written and oral segments.

47.2. In order to ensure that uniformly high standards are maintained, an officer nominated by Director General of Shipping shall set the question papers for the final examination.

47.4 The examinations would be conducted, and the papers valued, by the institution itself.

47.5 The institution shall retain the answer scripts for at least six months.

47.6 In order to ensure that proper valuation has been done, an external examiner of the Academic Council, or other officer appointed by the Director General of Shipping possessing a Certificate of Competency as Master FG, may review answer scripts at random and also ask questions of some of the cadets to assess overall the quality of training imparted.

47.8 The structure of the terminal examination is given in annex 4.

47.9 The criterion for issue of a passing out certificate is given in annexure 5.

47.10 Instruction for 'resits' of failed cadets is given in annexure 6.

47.11 The break up of the hours during the course is given in annexure 7.

47.12The format of the passing out certificate is given in annexure 8.

48. Entry of final certificates in the INDos:

The details of the four basic certificates – PSSR, PST, EFA and FPFF – and the final certificate issued to each cadet, after the course is over, shall be

communicated by the institute to the Principal, LBS CAMSAR, in a prescribed format, for entry of the same in the INDos.

49. Quality Standards:

Every institute imparting Pre-sea cadet training must have a quality standard as per Regulation I/8 of the STCW Convention to ensure achievements of the defined objective including those concerning the qualifications and experience of Instructors.

50. Approval

The promoters of the proposed academy should apply to the Directorate General of Shipping in a prescribed format and pay an inspection fee. The Directorate would arrange for inspection by a committee designated as the Academic Council. On receiving a favourable report on the compliance of the guidelines, and any other matters of relevance brought up by the Academic Council, the Directorate General of Shipping may grant written approval to the institution to conduct the course, stating therein the maximum number of cadets that may be trained at a time.

ANNEXURE 1
DETAILED SYLLABUS FOR THE THREE-MONTH PRE-SEA COURSE FOR DECK CADETS

0. INTRODUCTION – Lectures: 6 hours

.1. Explain 'Sea as a career in the Merchant Navy'.
.2. Explain duration, scope and objectives of the course.
.3. Explain basic ship organisation including the ranks and duties of all officers and crew on board.
.4. General knowledge of Indian shipping industry and trade pattern.
.5. Brief idea of Merchant Shipping Act and Safety Conventions of IMO.
.6. Brief idea of Articles of Agreement.
.7. Brief description of the functions of IMO, DG Shipping, MMD, Shipping Office, Coast Guard and Port State Control.

NAVIGATION FUNCTION

1. SPHERICAL TRIGONOMETRY

Lectures: 9 hours; Practicals 9 hours; Total 18 hours

1.1. Define and explain great circle, small circle, pole, spherical angle, spherical triangle.
1.2. Explain the properties of spherical angles and spherical triangles.
1.3. Explain the Sine & Cosine formulae and the possible ambiguities due to their use.
1.4. Explain the Haversine formula and its advantage over the Sine & Cosine formulae.
1.5. Conduct exercises on the solution of spherical triangles.
1.6. Explain right-angled spherical triangles and their properties.
1.7. Exercises in the solution of right-angled spherical triangles using Napier's Rules.
1.8. Explain quadrantal spherical triangles and their properties.
1.9. Conduct exercises on the solution of quadrantal spherical triangles using Napier's Rules.
1.10. Explain polar triangles and their use in the solution of spherical triangles.
1.11. Conduct exercises on the solution of spherical triangles.

2. METEOROLOGY - Lectures: 15 hrs; Practicals 6 hrs; Total 21 hrs.

2.1. The atmosphere: Explain the various layers of the atmosphere; atmospheric temperature: adiabatic changes, DALR, SALR, diurnal variation of atmospheric temperature; atmospheric pressure - semi-diurnal variation, barometric tendency.
2.2. Heat: Explain conduction, convection, radiation; insolation; why cloudy nights are warmer than clear-sky nights; green-house effect; the seasons; why polar regions are colder than equatorial regions; temperature zones of the world.
2.3. Water vapour in the atmosphere: Explain humidity, absolute humidity, relative humidity, saturation, dew point, meteorological application to hold ventilation.
2.4. The hydrological cycle: Explain evaporation, condensation, precipitation; general idea of the hydrological cycle; condensation near the ground - dew,

hoar frost, glazed frost, rime; types of precipitation - drizzle, rain, freezing rain/drizzle, snow flakes, snow pellets, sleet, ice pellets, hail.

2.5. Visibility: Define and explain visibility, mist, fog, haze, spray and their differences; judging and reporting visibility, types of fog - radiation fog, advection fog, smog, arctic sea smoke, orographic fog.

2.6. Clouds: Explain classification & description of the ten basic types of clouds; for-mation due to turbulence, orographic lifting, convection currents & frontal lifting.

2.7. Demonstrate the ability to use the International Cloud Atlas and identify various types of clouds.

2.8. Pressure gradient, wind and waves: Explain isobars, pressure gradient, Coriolis force (geostrophic force); sea, swell, gust, squall, veering, backing; Buys Ballot's Law; Beaufort wind scale and Beaufort weather notation; descriptive terms to use to describe sea and swell; true and apparent wind - their meaning and difference.

2.9. Judging wind: Explain the methods of estimating direction and force of wind at sea by the appearance of the sea and the use of the 'State of sea card'.

2.10. True and apparent wind: Explain difference between true & apparent wind.

2.11. Conduct exercises on problems involving true and apparent wind.

2.12. Explain the principle, construction, corrections, errors, maintenance and precautions when using the aneroid barometer.

2.13. Conduct practical exercises on reading the aneroid barometer and obtaining barometric tendency.

2.14. Other meteorological instruments: Explain the principle, construction, corrections, errors, maintenance and precautions when using the thermometer, the wet and dry bulb hygrometer, the Stevenson screen, the whirling psychrometer.

2.15. Conduct practical exercises on reading the thermometer, the wet and dry bulb hygrometer and the whirling psychrometer.

2.16. The 'Ship's Weather Code': Explain the 'Ship's Weather Code'.

2.17. Conduct exercises in coding and decoding of ship's weather reports.

3. NAVIGATION - Lectures - 36 hrs; Practicals 12 hrs; Total 48 hrs.

3.1. Explain the shape of the Earth, the meaning of the terms Axis of Rotation, Pole, Equator, Parallel of Latitude, Latitude, Meridian & Longitude.

3.2. Explain the terms D'lat & D'long.

3.3. Explain the meaning of 'Nautical Mile'.

3.4. Explain the term Departure and the relationship between Departure, D'long & Latitude. Conduct exercises in determining Departure, D'long & D'lat between two points on the earth's surface.

3.5. Explain the terms Mean Latitude & Mid-Latitude. Explain Plane Sailing Formulae & conduct exercises on their use.

3.6. Using Traverse Tables calculate the Course & Distance between two points on the earth's surface.

3.7. Explain the meaning of the Ship's Log, Log Distance, Dead Reckoned and Estimated Positions. Exercises on Day's Work.

3.8. Explain Mercator Projection. Explain the meaning of Meridional Parts & DMP. Explain Mercator Sailing Formulae and conduct exercises on their use.

3.9. Explain the contents and use of the Nautical Almanac.

3.10. Explain the revolution of the Earth and the position of the solstices and equinoxes.
3.11. Define the concept of Time and its relationship with Longitude on the earth's surface. Explain GMT, Zone Time, Standard Time & Apparent Time.
3.12. Define Rational Horizon, Visible Horizon & Sensible Horizon. Explain with the aid of diagrams.
3.13. Define, with the aid of diagrams, Zenith, Nadir, Vertical Circles, Prime Vertical, True Altitude, Zenith Distance, Declination, Polar Distance, Hour Angles, Aries & Azimuth. Exercises in drawing figures, reasonably to scale, on the plane of rational horizon.
3.14. Explain with the aid of diagrams, correction of altitudes using Dip, Refraction & SD separately and also using total correction tables.
3.15. Explain 'Latitude by Meridian Altitude'. Conduct practical training in observing the altitude of the Sun. Conduct exercises on the above.
3.16. Explain the meaning of Amplitude & Azimuth. Conduct exercises on obtaining Compass Error using the above using nautical tables. Explain method of obtaining times of Twilight, Rising, Setting, & Meridian Passage from the Nautical Almanac. Conduct exercises on the above.
3.17. Demonstrate stargazing - the identification of stars with reference to the main constellations.

4. CHART WORK – Lectures 21 hrs; Practicals 21 hrs; Total 42 hrs.

4.1. Explain the Mercator chart – Latitude scale, Natural scale, Longitude scale. The relation between latitude & longitude scales. Practical determination of distance on a Mercator chart.
4.2. Demonstrate chart reading. Knowledge of symbols & abbreviations used on British Admiralty & Indian charts. Familiarisation with B.A. NP 5011. The Compass Rose.
4.3. Explain plotting ship's position on a Mercator chart, the use of parallel ruler, set Square, compass, divider. Stress the importance of neatness in chart work. State the appropriate pencil to use in chart work. Explain the care & maintenance of charts.
4.4. Explain the meaning of Compass, Magnetic & True Course and Bearing. Deviation, Variation & Deviation Card.
4.5. Explain how Variation at a place is obtained from the chart after applying change in Variation. State that the latest chart should be consulted for this.
4.6. Conduct exercises on the conversion of Courses & Bearings between Compass, Magnetic & True.
4.7. Explain the layout of the ship's chart outfit. Familiarisation with the Admiralty Chart Catalogue & the Admiralty Chart Folio System.
4.8. Explain transferring position lines and courses on Mercator charts.
4.9. Introduce the Admiralty List of Lights. Explain the characteristics of lights.
4.10. Explain the Buoyage System in use worldwide with special emphasis on the IALA system.
4.11. Explain Dead Reckoned and Observed positions and the symbols used for indicating them on the chart. Explain fixing vessel's position using terrestrial cross-bearings and bearing and range.

4.12. Explain course steered, course made good, engine speed, speed made good, current, leeway, how to counteract current & leeway, estimated position (EP) and the symbol used to denote EP. .
4.13. Demonstrate and explain the use of Tide Tables at Standard Ports.
4.14. Introduce the Admiralty Sailing Directions and other publications.
4.15. Conduct exercises in above chart work techniques.

5. BRIDGE EQUIPMENT AND WATCHKEEPING

Lectures 24 hours; Practicals 12 hours; Total 36 hours

5.1. Introduce Lights & Shapes.
5.2. Over view of the Collision Regulations with specific emphasis on Rules: 3,5,7,8,13,14,15,16,17,18,21,22,23,24,25,26,27,28,29,30 & Annexure IV.
5.3. Elaborate the various methods to call the Master to the bridge and the circumstances under which he should be called.
5.4. Demonstrate the use of a Sextant for observing vertical and horizontal angles.
5.5. Explain the correctable errors of a sextant and demonstrate their methods of correction.
5.6. Demonstrate the use and care of marine Chronometer (winding and battery types). The importance of maintaining chronometer error log. Practical exercises on accumulated rates.
5.7. Demonstrate the arrangement and reading of a Wet Card Magnetic Compass during ship visit.
5.8. Demonstrate use of the Gyrocompass, Repeaters, and Course Recorder during ship visit.
5.9. Navigational equipment on the bridge to be demonstrated during ship visits.
5.10. Stress the importance of measuring depths below the ship. Simple explanation of the Echo Sounder and Depth Recorder.
5.11. Explain the basic working of Marine Radar.
5.12. Explain the watch keeping duties at anchor and at sea.
5.13. Explain the duties associated with preparing a vessel to proceed to sea.
5.14. Explain the procedure of testing controls.
5.15. Explain the procedure of taking over watch at sea
5.16. Explain the importance of recording all relevant information in Logbooks.
5.17. Explain the duties prior to arrival port.
5.18. Describe the procedure of embarking and disembarking a pilot.
5.19. Demonstrate the use of the Signalling Lamp. Conduct exercises on visual signalling using the Morse code.
5.20. Demonstrate and conduct exercises on the recognition and single letter meanings of International Code Flags.
5.21. Explain the proper procedure to use a walkie-talkie and a VHF set. The importance of minimal use of air time.
5.22. Briefly introduce the concept of GMDSS.

CARGO HANDLING AND STOWAGE FUNCTION

6. CARGO GEAR & CARGO WORK

Lectures 30 hours; Practicals 3 hours; Total 33 hours

6.1. Explain briefly the use of derricks, cranes ***on ships.***
6.2. Explain the types of pumps used on a tanker.
6.3. Explain the principal of the eductor system.
6.4. Describe the role of longshoremen, stevedores, foreman, ship's agent, supervisor.
6.5. Explain the overall procedure of loading, stowing and discharging of general cargoes.
6.6. Describe briefly the procedure of preparing the hold for loading general cargo and bulk cargo.
6.7. Explain the necessity, and the procedure, for segregation of various types of dry cargoes.
6.8. Explain the various types of dunnage used.
6.9. Describe the methods of securing of various types of cargo.
6.10. Explain cargo sweat, ship sweat and atmospheric sweat. State the precautions against cargo damage by sweat.
6.11. Explain briefly unitisation of cargo by palletisation and containerisation.
6.12. Explain very briefly the carriage of Refrigerated Cargo.
6.13. Explain the meaning of Stowage Factor and Load Density.
6.14. Explain briefly the Classification and Labelling of dangerous Goods.
6.15. Explain the procedure of keeping cargo watch in port.

SHIP OPERATION, SAFETY AND CARE OF PERSONS FUNCTION

7. NAVAL ARCHITECTURE

7.1. SHIP CONSTRUCTION

Lectures 12 hrs; Practicals: 3 hrs; Total 15 hours.

7.1.1. Explain in general terms the basic types of ships, i.e. General Cargo, Bulk Carrier, Container and Oil Tanker.
7.1.2. Explain the principal dimensions of a ship - LOA, LBP, EB, MB, MD, GT, NT. Name and explain the principal parts of ship including Peak Tanks, Double Bottom Tanks, Deep Tanks, Cargo Tanks, Ballast Tanks, etc.
7.1.3. Introduce the following ship plans: General Arrangement, Fire-fighting Appliances, Life-Saving Appliances, Pumping & Piping Arrangements.
7.1.4. Explain the following parts: Beam, Frame, Bulkhead, Hatch, Tank, Coaming, Hatch-Cover, Rudder, Deck, Hull, Bilge, Sounding Pipe, Air Pipe and Ventilator. Show where these are to be found on a ship.
7.1.5. Explain Draft Marks & Load Lines. Explain the method of reading draft marks in feet and in metres.
7.1.6. Conduct practical exercises on reading draft by use of a suitable model.
7.1.7. Explain the causes and simple methods of prevention of corrosion in a ship's structure. Brief notes on paint technology & anti-corrosion techniques.

7.1.8. Explain the term Dry Dock, the reasons for dry docking a vessel and give a general idea of the activities in a dry dock.

7.2. SHIP STABILITY

Lectures 9 hrs; Practicals: 6 hrs; Total 15 hours.

7.2.1. Explain the principle of flotation and the meaning of terms: Displacement, Deadweight, Form Coefficients, Reserve Buoyancy, Light Ship, Draft, Air Draft and Freeboard.
7.2.2. Explain TPC. State the formula for TPC.
7.2.3. Explain the effect of density on the draft of a vessel and meaning of the terms Fresh Water Allowance and Dock Water Allowance. State the formulae for FWA and DWA.
7.2.4. Define COG and KG of a ship. Explain the factors that affect KG.
7.2.5. Define COB. Explain the factors that affect KB.
7.2.6. Conduct practical exercises in calculations based on the above topics after each has been explained.

8. PRACTICAL SEAMANSHIP

8.1. GENERAL

Lectures 30 hrs; Practicals: 60 hrs; Total: 90 hours

8.1.1. Demonstrate and conduct practice on the use of various types of cordage, fibre and wire ropes used on ships.
8.1.2. Demonstrate and conduct practice on various types of whippings.
8.1.3. Demonstrate & conduct practice on various types of Knots, Bends & Hitches.
8.1.4. Demonstrate & conduct practice on types of splices on fibre and wire ropes.
8.1.5. Demonstrate the use of bulldog grips and bottlescrews/turnbuckles in joining wires.
8.1.6. Explain the care & maintenance of fibre and wire ropes including uncoiling, coiling, stowing, etc.
8.1.7. Conduct practical exercises on the use of blocks, snatch blocks and the differential pulley (chain blocks).
8.1.8. Different types of tackles & purchases and the power gained in each case.
8.1.9. Conduct practical exercises on the maintenance of various types of blocks, tackles, shackles and bottle-screws/turnbuckles, including opening, greasing, etc.
8.1.10. Explain mooring arrangements. Explain the use of a mooring shackle.
8.1.11. Conduct practical exercises on throwing heaving lines, use of rope & chain stoppers, mooring shackle and handling of mooring ropes. Use of slip-ropes.
8.1.12. Explain Anchor Work. Explain the parts of a windlass.
8.1.13. Explain the following terms in connection with anchor work: Cable, Link, Swivel, Joining Shackle, Shackle as a term of length, Bitter End.
8.1.14. Parts of a stockless anchor.
8.1.15. Demonstrate the ability to use a sledgehammer.
8.1.16. Conduct practical exercises on opening a lug and a lugless shackle.
8.1.17. Explain the uses of an anchor, how it is dropped, hoisted and secured.

8.1.18. Demonstrate the ability to climb a ship's mast
8.1.19. Demonstrate ability in rope climbing.
8.1.20. Types of paints, painting procedures and defects
8.1.21. Conduct practical exercises on chipping and painting. Demonstrate all tools and gear available for the maintenance steel parts of a ship.
8.1.22. Explain the various cargo gear used. Explain SWL and Breaking Stress. Conduct simple exercises on cargo gear rigging.
8.1.23. Conduct practical exercises on rigging and climbing pilot ladders and Jacob's ladders. Maintenance of the same.
8.1.24. Demonstrate the use of the bosun's chair.
8.1.25. Demonstrate the use of overside staging for shipside maintenance.
8.1.26. Demonstrate the use of the safety belt and safety harness during the earlier two operations.
8.1.27. Explain the methods of dealing with an oil spill on deck.
8.1.28. Explain the plugging of scuppers during bunkering, loading and discharging of oil cargo.
8.1.29. Explain the use and construction of a cement box to stop leaks.
8.1.30. Explain Magnetic compass points.
8.1.31. Explain steering and helm orders.

8.2. BOATWORK

Lectures Nil; Practicals 9 hrs; Total 9 hours

8.2.1. Explain the necessity to muster and ensure that each member of the boat crew wears boiler suit, safety shoes, helmet & life jacket.
8.2.2. The importance of checking that life jackets are worn correctly.
8.2.3. Explain the purpose of gravity davits and other arrangements for launching a lifeboat.
8.2.4. Practice procedure for preparation and launching.
8.2.5. 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.
8.2.6. Practice rowing with proper co-ordination.
8.2.7. Practice steering with tiller and proper use of oars.
8.2.8. Practice and then demonstrate the ability to pick up a buoy (representing a man overboard).

8.3. SHIP VISITS

Lectures Nil; Practicals 15 hrs; Total 15 hours

Practical familiarisation visits to merchant ships.

MISCELLANEOUS FUNCTION

9. WORKSHOP PRACTICALS - 75 hours

9.1. 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.
9.2. 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.

9.3. 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.

9.4. 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.

9.5. 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.

10. BASIC COMPUTER TRAINING
Lectures 6; Practicals 21 hrs; Total 27 hours

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

10.1. Introduction to Computers and Windows (7 hours):

10.1.1. Handling the Computer and peripherals

- Booting
- Keyboard layout and functions of different keys
- Proper shut down

10.1.2. 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

10.1.3. Shutting down the computer

10.2. MS Word (5 hours)

10.3. MS Excel (5 hours)

10.4. MS Access (5 hours)

10.5. 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.

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ANNEXURE 2

List of approved textbooks

For pre-sea courses for deck cadets

1. Spherical Trigonometry
2. Marine Meteorology
3. Principles of Navigation
4. Nories Nautical Tables
5. Practical Navigation
6. Chartwork
7. Nautical Watchkeeping
8. Bridge Equipment & Watchkeeping
9. Marine Sextant
10. Marine Chronometer
11. Magnetic Compass
12. Cargowork for Ship's Officers
13. Ship construction
14. Ship Stability I
15. ROR
16. ROR set of cards
17. Seamanship
18. Pre-Sea course syllabus.

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ANNEXURE 3

List of approved apparel & accessories

For pre-sea courses for cadets

		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.	White uniform peak-cap (first quality plastic) with cap band and zari badge (for not Sikhs)	1
12.	Soft peak-cap with monogram of the institution (for not Sikhs)	1
13.	Pugree - white cotton (for Sikhs only)	2
14.	Zari badge for use with pugree (for Sikhs only)	1
15.	Pugree - blue cotton (for Sikhs only)	2
16.	White webbed - nylon belt	1
17.	Epaulettes with full stripes	1
18.	Soiled linen bags (80 cm X 66 cm)	2
19.	White nylon stockings	2 pairs
20.	Blue cotton stockings	2 pairs
21.	Black nylon socks	2 pairs
22.	Clasp knife (Boy-scout type)	1
23.	Leather belt with a ring for clasp knife	1
24.	Night suits (Pyjama & top)	2
25.	White handkerchief (40 cm X 40 cm)	6

26.	Swimming trunks	1
27.	Coat hangers (Plastic) - 45 cm with cross bar	6
28.	Black shoes	1 pair
29.	Keds (ordinary canvas shoes)	1 pair
30.	Black safety shoes	1 pair
31.	Safety gloves	1 pair
32.	Calculator (Non-programmable & Non-scientific)	1
33.	Geometrical instrument box	1
34.	Exercise books - No. of books, their sizes & No. of pages in each book to be specified by the institute.	

Notes: -

1. Terycot here means 67% polyester & 33% cotton of a standard quality.
2. The institute must provide cots, mattresses, pillows and safety helmets on loan to cadets under training.
3. The institute must arrange for bed-sheets, pillow-cases, bath-towels, and counterpanes to the cadets under training either on loan or on ownership basis. Steps must be taken to ensure that these items are all of a uniform, standard quality and design.

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ANNEXURE 4

Structure of the final examination

(Non-programmable, non-scientific calculator may be used)

FUNCTION: NAVIGATION

Sr. No	Paper	Duration	Max. Marks	Pass %
1.	Spherical Trigonometry	2 Hrs.	50	50%
2.	Meteorology	2 Hrs.	50	50%
3.	Navigation- (1) Practical – 100 (2) Principles – 100	3 Hrs.	200	60%
4.	Chart Work	2 Hrs.	100	60%
5.	Bridge equipment & Watchkeeping	2 Hrs.	100	50%
6.	Visual Signals	-	100	90%
	TOTAL		**600**	

FUNCTION: CARGO HANDLING & STOWAGE

Sr. No	Paper	Duration	Max. Marks	Pass %
7.	Cargo Gear, Cargo Handling & Stowage	2 Hrs.	**100**	50%

FUNCTION: SHIP OPERATION, SAFETY AND CARE FOR PERSONS

Sr. No	Paper	Duration	Max. Marks	Pass %
8.	Naval Arch – (1) Constr. – 50 (2) Stability – 50	3 Hrs.	100	50%
9.	Seamanship Practicals (Integral Assessment)	-	200	50%
	TOTAL		**300**	

10.	**ORAL EXAMINATION:** on above three functions	½ Hr.	**100**	60%

FUNCTION: MAINTENANCE

Sr. No	Practicals (integral assessment)	Duration	Max. Marks	Pass %
11.	Carpentry Shop	-	20	50%
12.	Plumbing Shop	-	20	50%
13.	Machine Shop	-	20	50%
14.	Electrical Shop	-	20	50%
15.	Hotwork	-	20	50%
	TOTAL		**100**	

ANNEXURE 5 - Criteria for Issue of passing out certificate

1. **EXAMINATION:**

Pass in each written paper and practicals.

2. **ATTENDANCE:**
   - 2.1. The minimum classroom attendance required is 90%. However, attendance of 75% and above will be acceptable if the head of the institution is satisfied about the overall performance of the cadet.
   - 2.2. Where a cadet passes the final examination but is short of the prescribed minimum attendance due to genuine reasons acceptable to the head of the institution, a passing out certificate may be prepared and kept ready but handed over to the cadet only after he has attended those classes/practicals, that he had missed earlier, along with the next course. A report to that effect shall be sent to the Chief Examiner of Masters and Mates.
3. **COMPUTER PROFICIENCY:** The institution shall ensure that the cadet is proficient in the operation of computers and the use of the programmes listed in para 10 of annexure 1. In case a cadet does not obtain such proficiency by the end of the pre-sea course, his final passing out certificate should be withheld until his proficiency is demonstrated to the satisfaction of the institution.
4. **SWIMMING TEST:** The cadet should demonstrate his ability to swim a distance of at least twenty-five metres without a lifejacket. In case a cadet is not able to pass the swimming test by the end of the pre-sea course, his final passing out certificate should be withheld until he does.
5. **CONDUCT & DISCIPLINE:**

The head of the institution has the power to withhold the result of a candidate in case of gross misconduct or indiscipline. A report explaining the circumstances for such a decision must be forwarded to the Chief Examiner of Master & Mates.

6. **VIEWING OF ANSWER SCRIPTS BY A FAILED CANDIDATE:**

In order to ensure transparency of the examination system, a cadet who has been declared failed in a particular written paper may be permitted to see his answer script under the following conditions:

- 4.1. It must be within a period of two months after the declaration of the results.
- 4.2. The cadet must not be left alone with the answer scripts - viewing must be done in the presence of the course-in-charge or the head of the institution.
- 4.3. Parents, guardians, other cadets, etc must <u>not</u> be permitted to view the answer scripts.
- 4.4. The viewing time shall not exceed 15 minutes per answer script.

7. **APPEAL:**

The Chief Examiner of Masters and Mates is the appellate authority for all matters concerning pre-sea training. His decision shall be final.

ANNEXURE 6 - Instructions for resits

1. A cadet who fails in the final examination may be permitted to make up to three more attempts within a period of one year from the date of announcement of the results.
2. Such attempts shall be after a minimum period of one month from the date of announcement of the earlier results.
3. The institute shall announce the dates of such re-examination at the time of announcement of the results. Depending on the weakness shown by the failed

candidates the institute may announce two separate dates – one for those who fail in not more than two subjects and the other, for the rest.

4. A cadet who fails may proceed home and come only for the re-examinations.
5. A cadet needs to appear only in those written papers and/or practicals in which he had failed earlier.
6. The answer scripts of the re-examination may be perused at random by an officer of the Academic Council to ensure that proper valuation has been done.

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Annexure 7 – PARAMETERS

Total working weeks calculated @ 7 contact hours per day per week of 6 days.	***11 weeks***
Final Examination	***01 week***
Basic Modular courses	***02 weeks***
Holidays, Registration on joining, final passing out ceremony, etc.	***01 week***
TOTAL:	***15 weeks***

		Lectures	Practicals	Total
0	Introduction -	6	0	6
	FUNCTION: NAVIGATION			
1	Spherical Trigonometry -	9	9	18
2	Meteorology	15	6	21
3	Navigation	36	12	48
4	Chart Work	21	21	42
5	Bridge Equipment and Watch-keeping	24	12	36
	FUNCTION: CARGO HANDLING & STOWAGE			
6	Cargo Gear, Cargo Handling & Stowage	30	3	33
	FUNCTION: SHIP OPERATION, SAFETY AND CARE OF PERSONS			
7	NAVAL ARCHITECTURE			
7.1	Ship construction	12	3	15
7.2	Ship Stability	9	6	15
8	PRACTICAL SEAMANSHIP	-		
8.1	General	30	60	90
8.2	Boat work	0	9	9
8.3	Ship visits	0	15	15
	FUNCTION: MISCELLANEOUS			
9	Workshop Practicals	0	75	75
10	Basic Computer Training	6	21	27
11	Internal Evaluation	-	-	18
	Revision, internal assessment tests, etc.	-	-	12
	Grand Total excluding final examinations	**198**	**252**	**462**

Breakup of daily hours

Lectures/ Practicals per day:	=	7 hrs
PT/Parade:	=	1 hr
Games/Swimming:	=	1 hr
Cleanship	=	1 hr
Total per day	=	**10** hrs

ANNEXURE 8

Format of passing out certificate

NAME OF THE ACADEMY
ADDRESS
CITY
PIN CODE
Phone: (+ 91xx)_____ Fax : (+ 91xx)_____

PRE- SEA COURSE FOR DECK CADETS

This is to certify that Cadet_____
Roll No._____ D.O.B. (DD, MMM, YYYY) *INDos No. _____
has successfully completed a pre-sea course for deck cadets approved by the Directorate General of Shipping, Government of India vide approval letter No._____ dated _____
The course commenced on _____ and completed on _____

Colour Photograph
40 mm X 30 mm

Rubber stamp of institute

Embossed seal of institute

Cadet's Signature ***Date of issue*** ***Course Officer*** ***CAPTAIN SUPERINTENDENT***

* Indian National Database of seafarers
All enquiries concerning the certificates should be addressed to the issuing authority above.

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