

**SYLLABUS**  
**FOR**  
**THE TRADE**  
**OF**  
**VESSEL NAVIGATOR**

**GENERAL INFORMATION**

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|--|---|--|
| 1. Name of the Trade                   | : | <b>VESSEL NAVIGATOR.</b>   |
| 2. N.C.O. Code                         | : |  |
| 3. Duration of Craftsmen Training      | : | 2 Years.   |
| 4. Duration of Apprenticeship Training | : |  |
| 5. Entry Qualification                 | : | Passed in 10 <sup>th</sup> class examination under 10+2 system of education with 50% marks in Math. & Science or its equivalent. |
| 6. Rebate to Ex-Craftsmen Trainee      | : |  |
| 7. Ratio of Apprentice to workers      | : |  |

## SYLLABUS FOR THE TRADE OF VESSEL NAVIGATOR

Week No.		Trade Practical	Trade Theory	Engineering Drawing	W/S Cal. & Science	Gen.English/ Social Study	On Board Practical
NCVT	CIFNET						
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
1.		Visit to different sections of the Institute. Demonstration on elementary first aid. Artificial respiration etc.		Concept of Standard & Standardization.	Revision of elementary methodical process.		
2		<b>Fitting Section</b> Chipping  Understanding on the construction of engine.	<b>SHIPING GEAR MATERIALS, ACCESSORIES AND DESIGN</b> <b>Introduction to fishing gear materials-</b> General outline about fishing gear and utilization of fishing gear materials. <b>Classification of fishing gear material –</b> Natural and synthetic fibers-Origin, sources, extraction and processing details etc.	<b>Introduction for Machine Drawing</b> Introduction , meaning and usefulness of machine drawing.	<b>Arithmetic –</b> Simple problems on the first four rules	<b>Basic Grammer</b> Parts of speech –Noun subjective	Nil
3		Identification of synthetic and natural	<b>Construction details of twines and ropes –</b>	Instruments and materials used	-DO-	Pronoun, Verb, Adverb, Preposition,	Nil

		<p>materials. Basic construction detail of fiber, yarn strand etc. Spotters identification Lab. test, burning and smoke test for identification of material.</p>	<p>Details study about fiber, yarn, strand, ply, twines, rope etc. – Z twist and S twist. <b>Chemical and physical properties</b> – Natural and synthetic materials viz. Density, Tenacity, Breaking strength, Elasticity, abrasion, resistance, absorption etc.</p>	for drawing.	Calculation of efficiency.	Conjunction, Interjection.	
4		<p>Identification of spotters like different types of floats. Other accessories like shackle, thimble, purse ring G link assembly etc.</p> <p>Identification of synthetic fishing gear materials – Distinguish between bio degradable materials and Non biodegradable material.</p>	<p><b>Non textiles or hardware materials</b> – Glass, aluminium, iron etc. relevance to fabrication of fishing gear accessories. <b>Selection of fishing gear materials</b> – With relevance to species specific gear, and fishing technique adopted – selection of biodegradable materials in context of relevance to responsible fishing.</p>	-DO- PV diagram, indicator diagram, valve timing diagram, port timing diagram,	Fractions	Definition and example of tense use of tenses.	Nil
5		Identification of different type of yarn, twine and training to	<b>Yarn numbering system</b> – Yam numbering system	Code of practice for Engineering	Decimals	Use of tenses, <b>Kinds of sentences -</b> Simple complex and	Nil

		find out specification of yarn numbering system.	of twines, its implication in fishing industry- e.g. Direct and indirect system viz. British count, denier, tex, metric count etc. and their conversions.	Drawing (IS 696-1972)		compound	
6		Spotters identification viz. different types of floats – Lab. test buoyancy and extra buoyancy of floats.	<b>Classification of floats</b> Different types of floats, its buoyancy, extra,. Buoyancy, selection and purpose related to different fishing gear deployed. <b>Fishing gear accessories</b> – Thimbles, shackles, danleno swivel, G link assembly C and cut links, recessed link, purse ring, cod end ring etc. – purpose and uses.	-DO- Sketching of all parts with emphasis on liner, piston, connecting rod etc.	The unitary method	Assertive, interrogative, imperative, negative & exclamatory sentences.	Nil
7		<b>Training on measuring the accurate diameter of steel wire rope and appropriate specification,</b>  Construction of wire rope.  Spotters	<b>Steel wire ropes</b> – Construction, specification, material, braking load, maintenance and preservation –  combination rope, construction material, detail etc.	Scale , lines, lettering, titling, dimensioning, tolerance.	Time and distance	<b>Transformation of Sentences -</b> Active Voice Passive voice	Nil

		identification					
8		Demonstration of preservation with bark tannin, cutch coal-tar, copper compound sulphate and ammonia liquid.	<p><b>Sinkers</b> – Material selection, purpose and different types, uses.</p> <p><b>Important fishing gears (General description)</b></p> <p>Indigenous and modern fishing gears (e.g. Seine net, bag nets, one boat seines, gill nets, lines, trawl nets purse seines, Japanese type set-nets)</p>	<p>-DO-</p> <p>Schematic diagrams of all systems.</p> <p>Fuel pump, fuel injector, sketching of a schematic diagram</p>	<p>-DO-</p> <p>Fuel consumption</p>	Degrees with comparison	Nil
9		Fabrication of netting pieces- Head braiding, in different dimensions and mesh size, using trawl know, Double sheet knot, Reef knot.	<p><b>Preservation of fishing gear material</b> – With special reference to fishing gear fabrication twines ropes, nettings, steel wire rope etc. – process viz. tanning, tarring, drying, Dyeing etc. – Classification of preservatives, its method, process and</p> <p>Procedures etc. – Uses for different kind of fishing gear.</p>	<p><b>Plane geometry</b> – Terms and definition used – construction and division of lines, angles, triangles, quadrilaterals, polygons, circles and tangents.</p>	Square root	Transformation of sentences in part – II.	Nil

10		<p>Fabrication of netting pieces includes shaping viz., Baiting, creasing, flu mesh, doubling of mesh etc. Tailoring procedure in machine made netting includes point cut, bar cut, mesh cut and combination cut.</p>	<p><b>Fishing gear classification –</b> Active fishing gear, Mechanism of capture in each type of fishing gear in relation to type of fish and fishing ground</p> <p><b>Netting –</b> Definition of netting – in dispensable items required for fabrication of netting piece, mesh, bar, knot, top mesh, side mesh, use of different types of meshes, run of meshes-definition.</p>	-DO- Sketching the Schematic diagram	Logarithms	Direct Speech	Nil
11		<p>Measurement of bar length, stretched length of a mesh etc., Special emphasis on square mesh fabrication. Mounting as well as joining of netting pieces. Vertical joining. Horizontal joining, mesh to mesh and with additional half mesh.</p>	<p><b>Different aspects of fishing gear design –</b> Need for different designs, basic principles to be followed in designing, designing in relation to fish, gear, and method reading of design and preparation of design. By-catch reduction devices(BRDS) viz. TED. Separator panels, Rigid grid etc. in relevance to the code of</p>	-DO- Sketching the Schematic diagram	-DO-	Indirect Speech	Nil

			conduct for responsible fishing. Behaviour and distribution of targeted species, Fishing design, current, visibility and other factors.				
12			<p><b>Fishing gear Selectivity</b> Significance of fishing gear selectivity, trawl gear, determination of cod end mesh size – Recent advances in trawl fisheries and mesh selectivity – Selective trawl, square mesh and cod end, optimum mesh size; for multi species trawl fisheries, gill net, advances in hook selectivity.</p>	<p>-DO-</p> <p>Sketching the Schematic diagram</p>	<p><b>Mensuration –</b> Area of 2 dimensional plane figures</p>	Comprehension	Onboard practical on navigational aspects and fisheries
13		Training in all type of mountings adopting horizontal and vertical mounting, relevance to different type of fishing gear.	<p><b>Shaping –</b> Purpose of shaping, method of shaping braiding and cutting, creasing and baiting, fly-mesh comparative advantages of different</p>	<p>-DO-</p> <p>Sketching the Schematic diagram</p>	-DO-	Comprehension	Nil

			<p>methods.</p> <p><b>Mounting –</b> Necessity of mounting, different methods of mounting in relation to type of gear and method of fishing, stapling and receiving, selvedge and its importance.</p>				
14		<p>With help of visual aids and models otter board function and design details. Eye splices in steel wire rope – short and long splices and back splices in p.p. ropes. Universal testing machine operational</p> <p>technique – Testing of breaking strength, tenacity etc</p>	<p><b>Otter boards –</b> Basic principles function and design of Otter boards, Kites, different kinds of Otter board and construction of otter boards. Size and power of the otter board in relation to</p> <p>type of fishing, size of gear, depth of operation.</p>	<p><b>Solid Geometry –</b> Angles generally used and solid geometry, method of first angle and third angle projection and definitions.</p>	-DO-	Letter Writing	Nil
15			<p><b>Sweep lines –</b> Design details, construction and its impact on herding fishes and trawl mouth opening. <b>Gear testing –</b> Purpose, methods, instrument for testing.</p>	-DO-	<p>Three-dimensional solids, volumes.</p> <p>Calculation of power</p>	Precise writing	Onboard practical on navigational aspects and fisheries

			<p><b>Fish behaviour in relation to different types of fishing gear operation –</b> Species-specific design and reaction of fishes to different fishing gear.</p>				
16		<p>Class room practical Preparing the drawing Other types of vessels in merchant service. Classroom practical, preparing stability curves collect various stability of the institute training. On board the vessel,  Dry dock using the equipments and making report.</p>	<p><b>General parts of ship, construction –</b> Definition of main dimensions. The names of the principal parts of a vessel.  Mid ship section of a vessel, Framing, Beam, Maintaining water tight integrity, Freeing parts, rudders, steering gear, shell and deck plating, bilge keel, double bottoms, sounding pipes, air pipes, stiffening and strengthening to resist painting, pounding and longitudinal stresses.</p>				
17			<p><b>Terms and meanings –</b> Block co-efficient, Displacement and Dead weight Laws of floating today. Use of displacement and tones per centimeters impression scales to</p>	-DO-	<p>Lateral surface area -cube, cuboids, cylinder, cone and sphere</p>	<p>General essays practice</p>	<p>Onboard practical on navigational aspects and fisheries</p>

			determine weights of cargo or ballast from draught or freeboard.				
18			<p><b>Effect of density</b> of water on draught and freeboard</p> <p>Fresh water allowance.</p> <p>The meaning of the terms Buoyancy and Reserve buoyancy.</p> <p>Centre of gravity, centre of buoyancy.</p> <p>Metacentric height, Righting lever and Righting moment.</p>	-DO-	-DO-	Communicating English	Onboard practical on navigational aspects and fisheries
19		of starter. Motor and engine starting system.	<p><b>Stable</b>, unstable and neutral equilibrium. The effect of adding and removing weights on ship's centre of gravity, centre of buoyancy, metacentric height and list. Use of stability and hydrostatic data as supplied to fishing vessels and calculations based thereon....</p>	Projection of simple solids (construction) conventional representation and sectioning.	Total surface area - cube, cuboids, cylinder, cone and sphere	<p><b>Social Science</b></p> <p>Development of industry ;through five year plans</p> <p>Introduction of five year plans and their importance in the national economy, industrial development and employment generation with stress on current plan. New Economic Policy – Salient points</p>	Onboard practical on navigational aspects and fisheries
20			<b>Maintenance of vessels including fishing</b>	-DO-	-DO-	<p><b>Civics –</b></p> <p>* Silent feature of the</p>	Onboard practical on

			<p><b>vessels –</b> Safety care and maintenance of all life saving and fire appliances, light and sound signals and safe practices to be followed when fishing.</p>			<p>constitution of India * Preamble and directive principles * Fundamental rights and responsibility of a citizen <b>Population Growth &amp; socio economic inspection –</b> Employment, Housing, Food, Educational, Clothing, Transport, Environment, Ecological System.</p>	<p>navigational aspects and fisheries</p>
21			<p><b>Causes and simple</b> methods of prevention of corrosion in a ship's structure. Hull maintenance, Dry docking, preparation for certificate of inspection.</p>	-DO-	-DO-	<p><b>Salience feature of programme and series -</b> *Temporary and permanent methods of contraception with same knowledge of anatomy and physiology of human reproductive system. * NCH services including immunization and nutritional deficiency diseases. Dehydration therapy</p>	<p>Onboard practical on navigational aspects and fisheries</p>
22		<p>Sextant practical for tasking altitudes and adjusting the errors. Sketch the equipment, use of VSA &amp; HAS.  Starting,</p>	<p><b>Sextant –</b> The construction and use of the marine sextant including the optical principles involved. The detection and correction of sextant errors. The principles and use of the</p>	-DO-	<p><b>Algebra –</b> Quadratic equations</p>	<p>*Family welfare services available at primary health centers and sub-centres, urban family welfare centre and dispensaries. ESI, Rly.Hospital and Dispensary.</p>	<p>nil.</p>

		<p>Transportation and finding the error of the equipment.</p> <p>Parts, checking the error</p> <p>Find the deviation, deviation card preparation.</p>	<p>vernier and micrometer scales.</p> <p><b>Chronometer</b> – The use and care of marine chronometer and its errors.</p> <p><b>Magnet Compass</b> – The use and care of magnetic compasses. Magnetic and non-magnetic materials and their effect on the compass. Checking compasses. Practical limitation of the magnetic compass, flux gate compasses.</p>			<p><b>Awareness, cause and prevention of AIDS/HIV + STD</b></p>	
23		<p>Starting, stopping, finding the error.</p> <p>Taking the bearing and finding the error.</p> <p>Taking the bearing and finding the error.</p>	<p><b>Gyro Compass</b> – An elementary knowledge of the use and care of marine gyro compasses, including the procedure for starting and stopping. Routine oiling and cleaning and its effects. Routine operational checks. Application of latitude and speed error.</p> <p><b>Bearing Instruments</b> – The construction and use of azimuth mirrors – Procedure for checking accuracy of azimuth</p>	-DO-	-DO-	<p><b>Awareness and prevention from drug addiction.</b></p> <p><b>Role of craftsmen/Craftswomen In motivating to adopts small family norm.</b></p> <p>* By adopting contraceptive technique himself or herself</p> <p>* Acting as motivator in the community and educating fellow craftsmen and craftswomen for adopting contraceptive technique to adhere to small family</p>	nil

			mirrors. The construction and use of a Pelourus. <b>Maintenance of navigational records -</b>			norms <b><u>POPULATION EDUCATION</u></b> <b>National Welfare programme</b> * Population problem in India * Population objection in India till the year 2000 AD and onwards. Facts and figures about world population in comparison to India . Recovery of waste heat re-cycling of waste materials. Linkage of lack of energy conservation and environmental pollution.	
24		Practical – preparing the stability curve.  On board practical while load/discharge.  On board practical while fishing and prepare record.  On board practical during fishing trip and make a report.  Workshop practical and dry dock. And prepare the	<b>Basic</b> knowledge of IMCO recommendations concerning the stability of fishing vessels and use of stability data provided on board  <b>Loading and securing of catch on board ships</b>	-DO-	-DO-	Concept of environmental and ecological balance. The effect of over exploitation of natural resource and industrialization. Inter relationship between men and his environment and need for replacement of earth resources like soil, ground water, forest, river, sea and wild life. <b>Elements of environments planning and management</b> - Conservation of national sources	nil

		observation.				- Conservation of wild life -Creation of parks and Sanctuaries	
25			<p><b>Loading</b> and discharging operation with special regard to heeling moments due to gear during fishing operations.</p> <p>General knowledge of the measures designed for the protection of the crew on decks, superstructure, at desk opening and on stairway and ladders.</p> <p>General ideas of welding, types of weld, precautions taken.</p>	-DO-	-DO-	<p>a. Type of pollution and its sources</p> <p>b. Effect of pollution and environment and on humanity, plant, animal, machine, health and thus on energy conversation.</p> <p>c. Remedial steps to control pollution</p> <p>d. Environmental laws</p> <p><b><u>ENERGY CONVERSATION AND ENVIRONMENT MANAGEMENT</u></b></p> <p>Concept of energy. Non conventional sources of energy like solar wind, bio-gas etc. Energy crises and energy scarcity.</p> <p><b>Principal of energy conversation with special reference to –</b> Domestic appliances and cooking gas – transport – industries including</p>	Onboard practical on navigational aspects and fisheries

						industrial lighting-heating, ventilation and air conditioning.	
26			<p><b>Fundamentals –</b>  Basic of physics – Heat engines – Terminology of I.C.engines – Classifications of I.C. engines Standard marine phrases.</p>	-DO-	Simultaneous equation	<p><b>Working conditions and workers education</b>  i) Preliminary knowledge about the social security legislation as covered by the following Acts  a) Factory Act-1948  b) Workmen compensation Act-1923  c) ESI Act –1948</p>	Onboard practical on navigational aspects and fisheries
27		<p>Understanding the construction of the engines.   Identification of parts.</p>	<p><b>Principles of operation of I.C. Engines –</b>  Working Principle of four-stroke engine – two stroke engine.</p>	P.V. Diagram, Indicator diagram, Valve timing diagram	-DO-  Calculation on pitch etc.	<p>d) Employment standing Order – 1946  e) Payment of wages Act-1936  f) Minimum wages Act-1948  g) Industrial dispute Act-1947  h) Contact labour regulation and abolition Act-1970  i) Employees provident fund and payment of gratuity Act-1952</p>	nil

28			<p><b>Cycle of operation –</b> P.V. diagram two stroke – for stroke engines – valve timing diagram two stroke – four stroke engines – indicator diagram.</p>	<p>-do-</p> <p><b>Fastening –</b> Construction of nuts, bolts, rivets, screw, threads, shaft, keys, cotters, Spur gear.</p>	-Do-	<p>ii) Occupational hazard and safety measures = a) Causes of accident and safety management b) Theories of accident prevention c) Medical first aid d) Selection and use of personal protection equipment of different types. e) Use of fire safety equipment f) Safety legislation</p>	<p>Onboard practical on navigational aspects and fisheries</p>
29			<p><b>Advantages</b> disadvantages – difference between two stroke and four stroke engines – Heat balance.</p>	<p>-do-</p>	<p>Problems on equations</p> <p>Calculation of thread cutting, taper turning etc.</p>	<p><b>Human relations and Trade Unions</b> a) Organizational structure and employer – employee relation b) Purpose and functional of trade unions with respect to trade union Act and amendments c) Responsibilities and duties of workmen towards – society, orgn., work, vis-à-vis work culture</p>	<p>Onboard practical on navigational aspects and fisheries</p>

30			<b>Components of marine diesel engine –</b>	Free hand sketch of parts	-DO-	<b><u>ENTREPRENEURSHIP</u></b> Need and scope for self employment with special reference to self employment schemes and sources of assistance in central and State Govts. Organizations IDIC, SIDA, SISI, NSIC, SIDO, financial instts..of national Banks.	Onboard practical on navigational aspects and fisheries
31			-do-	-do-	-DO-	a) Characteristics of successful entrepreneur and a successful enterprises. b) Special objectives of business and entrepreneurship. c) The causes of failure identification of entrepreneurship abilities through self assessment and other techniques. d) The type of business in different trades and the importance of skills	-DO-
32			-do-	-do-	<b>Trigonometry –</b> Trigonometrically ratios	Understanding the consumers and market through consumer behaviour. Market survey, scope and influence,	-DO-

						publicity and advertisement, consumer action forum.	
33			-do-	-do-	-DO-	-DO-	-DO-
34		Understanding the systems and its accessories.  Starting procedure, watch keeping and overhauling.	<b>System of marine diesel engine –</b> Fuel system – cooling system - starting starting system – lubrication system.	Free hand sketch of systems	Compound angles	Product and site selection, finance, account keeping, inventory control, personnel management, business operation and criteria exports.	nil
35			-do-	-do-	-DO_	Case studies and project preparation.	Onboard practical on navigational aspects and fisheries
36			-do-	-do-	Multiple and sub-multiple angles	-Do-	-DO-
37			-do-	-do-	-DO_	<b><u>INFORMATION TECHNOLOGY(IT)</u></b> <b>Introduction –</b> a) Date and information-definitions – difference between information and date-information technology and importance of IT in to-days life. –need of	-DO-

						<p>information in business management – need of information in decision making.</p> <p>b) Over view of IT c) Use of phone, mobile, satellite, telephone, TV, VCR, Computer-Mail, Fax etc.</p>	
38			<p><b>Engine handling</b> – Operation – Preparation for starting – Watch keeping the running – Precaution for stopping – Maintenance – Scheduled maintenance – Preventive maintenance – Break down maintenance.</p>	-do-	<p>Product formula and identities. Calculation for thread, spur gear etc.</p>	<p><b>Various field of activity and their utilization</b> Application of computer in day-to-day life – Business, office, scientific, education, engineering, ticketing, hotel, medicine, military etc.</p>	-DO-
39			<p><b>Power development</b> – Power – IHP – BHP – FHP – SHP – EHP – power rating.</p> <p><b>Dry docking procedures</b> – Dry docking procedure – preparation before docking and undocking – preparation of defect list – safety procedure for entering and working</p>	<p><b>Introduction to computer drafting.</b> <b>Basic of CAD.</b></p>	-DO-	<p><b>Development of computers</b> – History-first generation computers, second, third, fourth type of computers – Super computers -Main frame computers - Mini computers -Micro (home computers, personal computers, laptop portable computers) –</p>	-DO-

			in confined spaces/welding/cleaning etc.			Personal computer (PC) - Stand alone - Intelligent terminal - Dumb terminal – their uses and limitations	
40		Field visit for acquainting with the system  Field visit and on board training in dry dock.	<b>Power Transmission-</b> Gear Box – Intermediate shaft – Stern tube – Propeller.	-do-	Heights & distances	-DO-	nil
41			-do-	Free hand sketch of systems	-DO-	<b>Components and computer</b> a) ACPU b) Memory (Primary and secondary) c) Auxiliary storage Devices-- Magnetic tape, magnetic disks, compact disks	Onboard practical on navigational aspects and fisheries
42		To convert compass course to true course and vice-versa. To plot a course between given positions and to measure the distance between them.	Preparation of charts, various types of charts, description of charts, nautical publications. Given variation and deviation of the magnetic compass or gyro error, to convert	Revision	<b>Describing motion</b> – definition of speed, velocity and acceleration	d) Input devices – key board, mouse, joystick, light pen. e) Out put devices – printers, (impact and non impact printers) – Visual display unit	nil

		<p>To find the compass course to steer by allowing or counteracting current and leeway.</p> <p>To find the set and drift experienced during a passage and then to counteract the actual current experienced.</p>	<p>true courses into compass courses and vice versa. To extract the deviation from sample table of deviations, hence to convert true courses into magnetic and compass courses. To find the compass course between two positions.</p> <p>The use of a single position line in approaching the coast.</p> <p>Reliability of charts.</p>				
43		<p>To fix the vessel's position by method and to then convert radio bearing to mercator bearing.</p> <p>To fix the vessel's position by running fix method with or without current.</p> <p>To fix the position with the help of position lines and circles.</p>	<p>The effect of current on speed. Allowance for leeway. Given compass course steered, the speed of the ship and direction and rate of currents to find the true course made good.</p>	Revision..	-DO-	<p>Date communications and computer network. Data types, sharing of data, sharing of resources., communication paths, satellites, cables, microwave system and high frequency waves, LAN, WAN etc. and internet.</p>	nil
44		To fix the position by three point method	To find the course to steer allowing for a	Revision	Different Formula of speed,	<b>Operation system</b> – Difference between	nil

		and to find the course to steer by right ahead method.  To plot the various courses during the passage, to find the total distance and to find the time taken to reach the destination.	current. Given the course steered and distance run to determine the set and rate of the current experienced between two positions.		velocity and acceleration	operating system – common commands of MS, DOS, WINDOWS, How to we interact with computer ? Hardware system – application – user.	
45		To find the height of tide time of tide using Indian tide tables.  To prepare a comprehensive details with the help of chart abbreviation book.	To fix a position on a chart by simultaneous bearings bearing and range, positional information from radio aids to navigation or by any combination applying the necessary correction.	Revision	-DO-	Programming language and Multimedia applications.	nil
46		Refer the nautical publications and make a record for each one them.	To fix the position by bearings of one or more objects with the run between, allowing for a current and to find the distance at which the ship will pass a given point.	Revision	Different Problems on speed, velocity and acceleration	Utility – Security, virus, future of computer – threads in 21” Century what is artificial Intelligence.	nil
47		To read, understand and make use of barometer and thermometer. The instruments supplied	Fixing the position by means of horizontal angles. Three point bearing method, Right ahead method.	Revision	-DO-	Merchant shipping act Marine pollution	nil

	<p>by the Meteorological office will be taken as standard.</p> <p>To use an azimuth mirror, pylorus (bearing plate) or other instrument for taking bearing..</p> <p>To use a sextant for taking vertical and horizontal angles, to read a sextant both on and off the arc, to correct a sextant into which has been introduced one of more errors of perpendicularity, side or index, to find the index error of a sextant.</p> <p>The rigging of fishing vessels, methods of ascertaining proof and safe-working loads of ropes including synthetic fiber and wire ropes with and without certificates of proof loads. Rigging purchases and a knowledge of the power gained their use.</p>					
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		<p>Knots, hitches and bands in common use. Seizing, racking, rope and chain stoppers. Splicing plated and multi-strand manila and synthetic fiber rope and wire rope with strict reference to current practice.</p> <p>Slinging a stage, rigging and boson's chair and pilot ladder.</p>					
48		<p>Marking and use of ordinary lead lines. Preparations of getting under way. Duties prior to proceeding to sea, making harbour, berthing alongside quays, jetties, or other ships and securing to buoys. Helm orders, conning the fishing vessel. Effects of propellers on the steering of a fishing vessel. Stopping, going astern knowledge of</p>	<p>Navigation and voyage planning in all conditions. Making land fall or proceeding along the coast in thick and clear weather.</p>	Revision	-DO-	<p>Marine Ecology and environment International conventions- SOLAS, MARPOL, STCW, ILO Conventions.</p>	nil

		maneuvering capabilities of fishing vessels including turning circles, stopping distances etc. effects of wind and currents on handling of fishing vessels. Turning of fishing vessel short round. Emergency maneuvers. Bringing a fishing vessel to single anchor in urgency. Man overboard.					
49		The duties of the watch keeping officer at sea, at anchor and at open roads. Anchors and cables, their use and stowage. Knowledge of the use of all deck appliances including emergency steering gear. Use and upkeep of sounding appliances, use and care of light and sound, signaling equipment including pyrotechnic light. The use and care of	To find the time and height of high and low water at standard ports.	Revision	-DO-	Revision	nil

		<p>life-saving appliances including handling characteristic, construction and stowage of life-rafts. Emergency signal, abandon ship signal, bending setting and taking in life boat sails, management of boats under oars, sails, power and in heavy weather, recovering boats at sea. Beaching or landing. Survival procedure in life-boats and life-rafts. The use and care of rocket and line throwing apparatus.</p>					
50		<p>The use and care of fire appliance including the smoke helmet, emergency fire pump and self-contained breathing apparatus. Action to be taken on discovering a fire – in port – at sea. Knowledge of the precautions to be</p>	<p>Information given on a chart or plan particularly about Buoys, lights, Radio Beacons, Navigational Aids, depths and nature of bottom, use of soundings, recognition of the coast and Radar responsive targets – depth and height contours.</p>	Revision	-DO-	Revision	nil

		<p>observed to prevent pollution of the marine environment.</p> <p>Distress and pilot signals, penalties for misuse. International life-saving signals.</p> <p>A knowledge of the contents of 'Merchant Shipping Notices' and 'Notices' to Mariners'. The use of Notices of Mariners and Merchant ship search and resume manual (MERSAR).</p> <p>The IALA system of buoy age. Precautions while using floating navigational aids.</p> <p>E.g. buoys, light vessel etc.</p> <p>The examiner may ask the candidate questions arising out of the written work, if it is deemed necessary on account of weakness shown by the candidate.</p>					
51		<p>A full knowledge of the content and application of the collision</p>	<p>Use of sailing directions, Admiralty catalogue of charts and list of lights.</p> <p>- To understand</p>	Revision	Revision	Revision	nil

		Regulations.	<p>the use of Notices of Mariners and to be familiar with the process of chart correction.</p> <ul style="list-style-type: none"> <li>- To understand the dangers of placing implicit reliance upon floating navigational aids.</li> <li>- To understand the use of Decca lattice charts and Decca correction sheets.</li> </ul>				
52		<b>REVISION, TEST, EVALUATION OF PROGRESS</b>					



**SYLLABUS**  
**FOR**  
**THE**  
**TRADE**  
**OF**  
**VESSEL NEVIGATOR**  
**SECOND YEAR**

Week No.		Trade Practical	Trade Theory	Engg. Drawing	W/S Calculation & Science	Genl.English/ Social Studies	On Board Practical
NCVT	CIFNET						
53		Nil	<p><b><u>Naval Architecture and Ship Construction</u></b>  <b>Hydrostatics</b> –Density – Relative density-pressure exerted by a liquid-load on an immersed plane- centre of pressure- load diagram-sheering force on bulkhead stiffeners</p> <p><b><u>SHIP CONSTRUCTION</u></b>  <b>Stresses in ship structure</b>  Longitudinal bending in still water and waves- transverse bending- stresses when docking- pounding- panting</p> <p><b>Force end arrangements</b>  Stem plating-anchor-cable arrangement</p> <p><b>Behavior of vessels at sea</b></p>	<p><b>SHIP CONSTRUCTION</b>  Free hand sketch</p>	- Nil -	- Nil-	Onboard practical on Navigation aspects & fisheries
54		Nil	<p><b>Displacement, TPC, coefficients of form</b>  Archimedes principle- displacement-tonne per cm immersion –coefficient of form</p> <p><b>SHIP CONSTRUCTION</b>  <b>Bottom and side framing</b>  Double bottom-internal</p>	<p><b>SHIP CONSTRUCTION</b>  Free hand sketch</p>	- Nil -	- Nil-	-do-

			structure-side framing-tank Side bracket-beam knees- web frames				
55		Nil	<b>Displacement, TPC.</b> <b>Coefficients of form</b> <b>Marine Corrosion –</b> Wetted surface area-similar figures-sheering force and bending moment <b>Centre of gravity</b> Centre of gravity-effect of addition of mass- effect of movement of mass-effect of suspended mass <b>SHIP CONSTRUCTION</b> <b>Shell and decks</b> Shell plating-bulwarks- deck plating-beams-deck Gurders and pillars discontinuities-hatches- hatch corners	<b>SHIP</b> <b>CONSTRUCTION</b> <b>Free hand sketch</b>	- Nil -	- Nil-	-do-
56		<u>Nil</u>	<b>Stability of ships</b> Statical stability at small angles of heel-calculation of BM-metacentric diagram – inclining experiment –free surface effect-stability of large angles of heel <b>SHIP CONSTRUCTION</b> <b>Bulk heads</b> Water tight bulk head-water tight doors-non –water tight-bulkhead	<b>SHIP</b> <b>CONSTRUCTION</b> <b>Free hand sketch</b>	- Nil -	- Nil-	-do-

57		Nil	<p><b>Stability of ships</b> Stability of a wall-sided vessel</p> <p><b>Introduction to fishing crafts</b></p> <p><b>Boat Building materials</b> Steel, Fibre glass, other composite materials, wood, Characteristics of Boat Building timbers</p> <p><b>Terms in boat building</b> General descriptions</p> <p><b>SHIP CONSTRUCTION</b></p> <p><b>Aft end arrangements</b> Transom stern-stern frame and rudder-ship tunnel-Kort nozzle-fixed pitch propeller-variable pitch propeller</p>	<p><b>SHIP CONSTRUCTION</b> <b>Free hand sketch</b></p>	- Nil -	- Nil-	-do-
58		Nil	<p><b>Importance of lofting in boat building</b></p> <p><b>Construction</b> Backbone assembly Building stock, making the moulds, Rabbet building of wood..</p> <p><b>SHIP CONSTRUCTION</b></p> <p><b>Fish hold</b> Insulated fish hold</p>	<p><b>SHIP CONSTRUCTION</b> <b>Free hand sketch</b></p>	- Nil -	- Nil-	-do-
59		Nil	<p><b>Construction-</b></p> <p>Hull planking-different types Framing and longitudinal Deck beams and carlings</p>	<p><b>SHIP CONSTRUCTION</b> <b>Free hand sketch</b></p>	- Nil -	- Nil-	-do-

			<b>Knees, Riders and pointer Reading drawing on various constructional stages of a ship.</b>	Nil			
60		Nil	<b>Construction</b> Deck planking Floor timbers and Engine bearers Stern tube arrangements, Bulkhead	Nil	- Nil -	- Nil-	-do-
61		Nil	<b>Caulking and stopping Wheel house and other superstructures, rigging Sheathing Underwater fittings Painting and varnishes</b>	Nil		- Nil-	-do-
62		Nil	<b>Engine installation, alignment</b>	Nil	Calculation on hydro pressure, low etc.	-do-	-do-
63		On board practical- local visit to fishing harbour.	<b>Tanks and pumping work Deck fittings</b>	Nil	Calculation of displacement, TPC, coefficient W.S.A. etc.	- Nil-	-do-

64		On board practical training, demonstration trips to impart training on fishing technique.	<b><u>FISHING TECHNIQUE</u></b> <b>Different types of fishing boats, general description-</b> Indigenous type, mechanized boats, modern type of finishing vessels.	Nil		- Nil-	-do-
65		On board practical training, demonstration trips to impart training on fishing technique	<b>Finishing methods</b> Important indigenous methods, Beach and shore seines.	Nil	- Nil -	- Nil-	-do-
66		Fabrication of different type of model trawl nets. Purse seine nets, gill net and simple hook line and Llong line	<b>Finishing methods</b> Bag nets, set net and line fishing a) Trawling b) Bill netting	Nil	- Nil -	- Nil-	-do-
67		Fabrication of square mesh cod-end and BRDS models.	<b>Modern Fishing methods</b> Long lines Purse seining	Nil	- Nil -	- Nil-	-do-
68		-do- Drawing practice and	<b>Modern Fishing methods.</b> Trolling Trapping	Nil	- Nil -	- Nil-	-do-

		design of a) Fishing gear design of different type of trawl, purse seine and Gill net.	The above topics also to be dealt in context of code of conduct for responsible fishing.				
69		Drawing practice and design of b) Deck equipment and fishing accessories.  Reading of drawings	<b>Code of conduct for responsible fishing</b> Selective fishing gear and practices- Environment and eco-friendly fishing gears And enhancement of resources.	Nil	- Nil -	- Nil -	- Nil -
70		Drawing practice and design of Deck layout of all types of fishing vessels including combination vessel.	<b>Energy conservation</b> Fishing gear and modern methods /Modern fishing vessels and its technology <b>Fishing accessories</b> Fishing accessories- winch, gurdie, Rollers, Line-haulers, Power blocks, Purse seines.	Nil	Flow of fluid velocity, volume, discharge time etc. calculation.	Nil	- Nil -
71			<b>Fishing accessories</b> Davite, gallows (single and double)_ fair leads, derricks, Pulley system, Mast rigging.	Nil	- Nil -	- Nil -	Onboard practical on Navigational aspects & fisheries.
72		Dismantling and assembling of all	<b>Deck lay out</b> Various types of deck layouts for different types of fishing including	Nil	Discharge	- Nil -	Onboard practical on Navigational aspects & fisheries

		pumps	combinations. 1. Gill netters- Bow pickers, tern picker and reel gill netter		capacity, power of pumps calculations, operational level.		
73		Dismantling and assembling of all motor	<b>Deck lay out</b> 2. Trawler- Stern trawler, side trawler and outrigger trawler 3. Purse seiner 4. Long liner 5. Combination vessels etc. (Trawler- purse seiner,. Trawler gill netter, multipurpose.	Nil	Power and capacity calculation operational level	- Nil-	Onboard practical on Navigational aspects & fisheries
74		Identification of selected plank tonic organisms phyto and zooplankton benthic organisms. Elementary study of fish and its various parts- scales, fins etc. and basic identification methods.	<b>Introduction to Marine Environments</b> Ecology, Habitat, Biosphere, Biotope, Ecosystem, Estuaries etc. Physical and chemical factors (biotic & abiotic), and their importance, Inshore and Offshore regions, Pelagic and benthic zones, continental shelf, continental slope, Littoral and deep sea, Sandy, rocky and muddy shores and characteristics of the organisms in these zones	Nil	- Nil -	- Nil-	-do-

75			<p><b>Marine Population its interaction in the Ecosystem</b> Plankton, Nekton and Benthos Role of plankton, and benthos in Fisheries</p> <p><b>Marine Capture Fisheries</b> Difference between Cartilaginous and bony fishes</p>	Nil	- Nil -	- Nil-	-do-
76			<p><b>Marine Capture Fisheries</b> An elementary study of a typical fish, General character of fishes- its various vital systems. Marine fishes and fishery resources of India, pelagic, mid-water and benthic fisheries</p>	Nil	Power and capacity calculation, operation level	- Nil-	-do-
77			<p><b>Fish Behaviour and population Migration of fishes</b> Regular horizontal migrations- Anadromous. Catadromous, regular Vertical Migration, Physical, Chemical and Biological aspects of fish migration</p>	Nil	- Nil - -	- Nil-	-do-

78		<p>Identification of selection Planktonic organism phyto &amp; Zooplankton &amp; benthic organisms</p> <p>Elementary study of fish &amp; its various parts – scales , fins &amp; basic identification methods.</p>	<p><b>Fish Behaviour and population</b>  <b>Other behaviour of fishes</b>          Shoaling behaviour of fishes, Shoaling behaviour of oil sardine, mackerel, tuna  <b>Fish Population Study</b>          Fish stock – Abundance of fish and factors limiting abundance, Catch per Unit Effect index (CPUE)</p>	Nil	- Nil -	- Nil-	-do-
79			<p><b>Handling and transport of fish</b>          Handling fish and prawns onboard the fishing vessel- people involved in the process, washing and sorting, supply of clean water, evisceration, time, bleeding, packing and transport, containers for transport, transportation of live fish, personal hygiene in fish handling.</p>	Nil	- Nil -	- Nil-	Onboard practical on Navigational aspects & fisheries
80		Nil	<p><b>Spoilage of fish</b>          Principal constituents (biochemical) of fish, Microbiology of a tropical fish, Post mortem changes in fish , Assessment of freshness of a fish and the methods, Fish spoilage –</p>	Nil	- Nil -	- Nil-	Onboard practical on Navigational aspects & fisheries

			Agencies of the spoilage of fish – Bacterial spoilage , Enzymatic spoilage, Spoilage in fresh water and marine fishes.	Nil			
81		- Nil -	<b>Fresh Preservation methods-post harvest methods</b> Fish thawing, Chilling and Curing methods-icing and its types, freezing and different types, freezing in fish and prawns, salting and drying and its different types, smoking , its different types, canning and its problems..	Nil	- Nil -	- Nil-	Onboard practical on Navigational aspects & fisheries
82		- Nil -	<b>Fresh Preservation methods-post harvest methods</b> Irradiation preservation and other preservation methods, Seafood quality assurance systems in India- IPQC and HACCP standard <b>Value added products</b> Pickling of fish, Mas Min and Surumi production, Canning of oil sardine, Tuna and prawn, fish sausages and kneaded products, Fish protein	Nil	- Nil -	- Nil-	Onboard practical on Navigational aspects & fisheries

			concentrates, Marine oils and Fish meals, Marine algal products ,Utilisation of fish by products- fish maws, fish oils, shark skin leather, fish glue, bache-de-mer, chitosen from prawn waste and squilla, idian standard for fish and fishery products.	Nil			
83		Demonstration of equipments.	<b>Elementary Acoustics</b> Sound waves and propagation oof sound, Velocity, wavelength, reflection, echo, ultrasound, range, measuring distance by sound.	Nil	- Nil -	- Nil-	<b><u>VIVA VOCE</u></b> <b>FISHING GEAR TECHNOLOGY-</b> a)Fishing gear materials b)Fishing Technique c) Marine Fisheries, Fish Processing & Fish Fishing Equipments
84		- Nil -	<b>Fish finding equipments</b> Principle of Echo sounding, block diagram of echo sounder, operation, main parts of echo sounder	Nil	- Nil -	- Nil-	<b><u>VIVA VOCE</u></b> <b>FISHING GEAR TECHNOLOGY-</b> a)Fishing gear materials b)Fishing Technique Marine Fisheries, Fish Processing &

							Fish Fishing Equipments
85		To prepare neat diagrams for each definitions and make a record book.	<b>Fish finding equipments</b> Controls, video echo sounders and features, <b>SONAR, NET SONDE, and GPS</b>	Nil	- Nil -	- Nil-	Nil
86		To prepare neat diagrams for each definitions and make a record book	The shape of the earth. Poles, equator, meridians, Parallel of latitude .Position by latitude and longitude. Bearing distance , units of measurement.	Nil	- Nil -	- Nil-	Nil
87		To calculate position arrived, course, distance using Norris tables and without using tables.	Difference of latitude difference of longitude, departure, mean and middle latitude, difference of meridional parts and the relationship between them. Use of position lines with or without run.	Nil	- Nil -	- Nil-	Nil
88		- Nil -	Celestial sphere, Declination, Azimuth, Sidereal hour angle, Ediptic, First point of aries, Greenwich and other standard time, apparent time, sidereal time, Equation of time. Relationship between	Nil		- Nil-	<b><u>VIVA VOCE</u></b> <b>FISHING GEAR TECHNOLOGY-</b> a)Fishing gear materials b)Fishing Technique Marine Fisheries, Fish Processing &

			longitude and time.				Fish Fishing Equipments
89		To calculate the position of the ship at the time of noon of next day using the given information and with the help of traverse tables.	Practical problems on plane, parallel and Mercator sailing	Nil	- Nil -	- Nil-	Nil
90		Take the meridian altitude and to calculate the observed latitude and position line using nautical almanac.  Calculate latitude, deviation and compass error by taking the altitude of pole star using nautical almanac.	The use of the traverse tables to obtain the position of the ship at any tiome, given compass courses, variation deviations and the run recorded by long or calculated  By time and estimated speed, allowing for the effects of wind and current, if any.	Nil	- Nil -	- Nil-	Nil
91		To work out the problems by various methods such as long by chord, Intercept, ex-meridian.  To calculate the compass error and deviation using amplitude and azimuth method.	To find the latitude by meridian altitude of a heavenly body.	Nil		- Nil-	Nil
92			To find position line and	Nil			

		- Nil -	position through which it passes from an observation of sun Or star out of the meridian	Nil	- Nil -	- Nil-	Onboard practical on Navigational aspects & fisheries
93		Analysis of weather maps by plotting isobars and isotherms.	To find the true bearing of a heavenly body, the compass error and hence the deviation of the magnetic compass of the dirction of the ship's head. To find latitude by observation of pole star	Nil	- Nil -	- Nil-	Nil
94		<b><u>Fishing Gear</u></b> Basic netting –mesh bar, mesh size-stretch mesh and cross mesh (Run with the mesh and across) Net making implements-Needle and gauge Basic net making-practice with traw.l knot reef knot (square knot double knot etc.)	General idea of atmosphere, composition and vertical structure, whether and climate, diurnal variation of atmospheric temperature over land and sea, lapse rate, Isothermal layer. Atmospheric pressure, semidiurnal and seasonal variations, barometric tendency, isallobars, storm predictions by observations of atmospheric pressure, use of barometric observations and weather signs.	Nil	- Nil -	- Nil-	Nil
95		Net making implements –Needle and gauge. Basic net making-	Water vapour in the atmosphere , humidity, absolute and relative humidity, saturation and dew point, Fohn wind	Nil	- Nil -	- Nil-	Nil

		practice with trawl knot reef knot (square knot double knot etc.)	effect, adiabatic lapse rate of temperature, rain shadow areas of the mountain range. Hydrological cycle, evaporation, condensation, precipitation, drizzle, rain, snow flakes, snow pellets, hail Condensation near the ground, formation of dew, frost, rime.				
96		Shaping of netting by braiding, creasing, baiting..	Visibility, judging and reporting visibility, mist and fog, types of fog-radiation fog, advection fog, orographic fog, smog; Haze, spray and their effect on visibility. Clouds-formation, classification due to height and appearance of the ten basic types commonly seen and their abbreviations.	Nil	- Nil -	- Nil-	Nil
97		Shaping of netting by tailoring	Pressure and wind systems, isobars and pressure gradient, meaning of veering, backing, gust and squall, Buys Ballots law, cautions for applying Buys Ballots, law, carioles force and its significance, carioles force and its	Nil	- Nil -	- Nil-	Nil

			significance, carioles parameter. True and apparent wind- their meaning and difference, estimation of direction and force of wind at sea, katabatic and anabatic winds.	Nil			
98		Hanging (mounting) of netting, Top & side mounting, different methods Hanging ratio. Joining of netting	General circulation of atmosphere, doldrums, ITCZ, thermal equator, Trade winds, motions of earth, seasons, perihelion and aphelion.	Nil	- Nil -	- Nil-	Nil
99		Mending	Tropical revolving storms, tornado and water spout , pressure and wind distribution in the Indian ocean sector, jet streams.	Nil	Calculation of heat generated by a system and capacity of plant required.	- Nil-	Nil Nil
100		Splicing- rope splicing and wire rope splicing. Fabrication of model nets.	Monsoon-SW and NE monsoons, periodic and local winds, Norwesters and Elephantas, land and sea breeze.	Nil		- Nil -	Nil

101		Splicing- rope splicing and wire rope splicing. Fabrication of model nets.	Cyclones and anti cyclones, cyclone prone regions, cyclogenesis area, ideal conditions for the formation of TRS, structure of TRS, warning signs.	Nil	- Nil -	- Nil-	Nil.
102		- Nil -	Weather reporting system- A knowledge of weather messages available for shipping , classification of voluntry Observing Fleet.(VOF), weather bulletins in Indian waters, whether warnings and signals.  A detailed knowledge of the Meteorological instruments normally used on fishing vessels- Marine thermometer, Barometer, Barograph, Whirling Psychrometer, Anemometer and wind vane.	Nil	Requirement of refrigerant system  Testing of duplicating oil	- Nil-	<b>ONBOARD TRAINING – NAVIGATIONAL ASPECTS AND FISHERIES</b> Report on Onboard training navigational aspects & fisheries

103			<p>.Sea surface current system in Indian Ocean Sector, Equatorial current system during NE and SW monsoon periods.</p> <p>Physical properties of ocean-temperature, salinity, density, General distribution of temperature and salinity in ocean, thermo cline and halocline regions.</p> <p>Ocean waves, wave parameters, classification of waves, sea and swell waves, Internal waves, ocean tides tidal ranges, spring and neap tides, ebb and flood tides.</p>	Nil			
104		<b>REVISION AND FINAL TRADE TEST.</b>					