

BHARATHIARUNIVERSITY: COIMBATORE-641 046
CERTIFICATE IN ENGINE CADET
(For the CCII students admitted from the academic year 2016-17 onwards)

COURSE OBJECTIVES

- 1.To introductionthe shipping knowledge
2. Marine Engineering at the Operational Level
3. ToWorkshop Practice
4. Main and Aux Machinery Operation and Maintenance
5. Electrical Electronic and Control Engineering the Operational Level
6. Maintenance and Repairs at the operational level

Duration :6 Months (Fully Residential Course)

Eligibility : A Pass in SSLC Examination

SCHEME OF EXAMINATION

S.No	Course Title	EXAMINATION	
		Duration Hours	Total Marks
1	Theory 1 : Marine Engineering Knowledge	3	100
2	Practical 1 : Marine Engineering Workshop -I	3	100
3	Practical 2 : Marine Engineering Workshop -II	3	100
Total			300

THEORY PAPER 1 : MARINE ENGINEERING KNOWLEDGE

UNIT – I:INTRODUCTION TO THE SHIPPING KNOWLEDGE

Sea as a career in the Merchant Navy, duration, scope and objectives of the course, parts of a ship using models or suitable video films, Basic types of merchant ships – General Cargo, Bulk Carrier, Container Ship and Oil Tanker, basic ship organisation including the ranks and duties of all officers and crew on board, ship-shore related organisations & persons – ship owner, charterer, Company's superintendent, Agent, Ship chandler, Stevedore, shipper, Consignee, pilot, Surveyor, Longshoreman, Repair workshop, etc., safe engineering Watch keeping, principle basic fitting, operational guidance, English in written and oral form (Communication skill and proficiency in Marine Vocabulary English), Comprehension and speech.

UNIT – II :MARINE ENGINEERING AT THE OPERATIONAL LEVEL

Fabrication and repair operations typically performed on ships, Hand and power tools, basic workshop practice basic fitting, Machine tools and processes, measuring instruments, Fabrication, welding, joining and cutting, Properties of materials, lab testing and Industrial chemistry, hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations, electrical measuring and testing equipment in lab and workshop, electronic instrument, measuring equipment and interpretation of results obtained

UNIT – III :WORKSHOP PRACTICES

Hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of ship board plant and equipment, Marine equipment drawing, notations and interpreting the drawing etc., Tools for Marine equipment assembly, repair and maintenance, correct type of hand tools, power and measuring equipment.

UNIT – IV:MAIN AND AUX MACHINERY OPERATION AND MAINTENANCE

Main and auxiliary machinery and associated control systems, main and auxiliary machinery on board, including steering gear, air compressor, Boiler and refrigeration machinery, Preparation of auxiliary and main machinery for operation, Location of common faults, machinery malfunction, troubleshooting and action necessary to prevent damage.

UNIT – V:ELECTRICAL ELECTRONIC AND CONTROL ENGINEERING THE OPERATIONAL LEVEL

Operate pumping systems and associated control systems, Marine pumps, valves and piping systems – operation and maintenance, Familiarisation of ship's bilge, ballast and cargo oil pumping systems. The operations must be carried out according to established rules and procedures, Operate and maintain alternators, generators and control systems, Marine Electro Technology. AC, DC machine, power circuits, electrical switch gears and starters, Lighting system and locating common faults on board, Electronic monitoring and control equipment fitted on board. Study of semi-conductors diodes, transistors, amplifiers, thyristors and their testing. Ship's internal communication system and electronic steering gear, Operation repair and maintenance of AC, DC machinery and circuit breakers, Routing testing and maintenance on electrical components MSB fittings, lights, batteries and Alarm systems.

UNIT – VI :MAINTENANCE AND REPAIRS AT THE OPERATIONAL LEVEL

Maintain Marine Engineering Systems including control systems, Maintenance overhaul of heat exchangers, Marine diesel engines, Air compressor, Boiler and refrigeration machinery, Dismantling, reassembling and try out machinery, Safe working practices.

REFERENCES :

1. Pounder's Marine Diesel Engines – C.T.Wilbur – DA Wight – 6th Edition
2. Pounder's Marine Diesel Engines and Gas Turbines – Doug Woodyard – 8th Edition
3. Introduction to Marine Engineering – DA Taylor
4. Diesel Engines – AJ Wharton – 3rd Edition
5. Marine Engine Room Blue Book – William B. Parterson
6. Lamb's Questions and Answers on the Marine Diesel Engines – Stanely G. Christersen – 8th Edition
7. Marine Auxiliary Machinery – HD Mc George – 7th Edition
8. Marine Engineering Practice VikramGokhale / N.Nanda
9. The running and maintenance of Marine Machinery – J Cowley
10. Introduction to practical Marine Engineering (Volume 2 : Figures) – Alan L.Rowen, Raymond F. Gardner, Jose Femenia, David S.Chapman, Edwin G.Wiggins
11. Marine Engineering knowledge for junior engineers – VikramGohale, N,Nanda
12. Electricity Applied to Marine Engineering – W.Laws – 4th Edition
13. General Engineering knowledge for Marine Engineers (Volume – 8) – Reed's
14. Marine Steam Boilers – J.H.Milton and R.M.Leach

Reference Videos :

1. Personal Safety in Engine Room
2. Marine Diesel Engine Models
3. Engine Videos (2 and 4 stroke Engine)

PRACTICAL PAPER 1 : MARINE ENGINEERING WORKSHOP - I

UNIT – II :MACHINE / FITTING SHOP

Hand tools and safe working practices, Machine shop (Lathe machine & Grinding machine), Fitting shop, Bench work, carryout the operations such as Chiseling, cutting, filing, marking, drilling tapping

UNIT – II :FABRICATION SHOP

Welding tools and safe working practices, Gas welding kit and welding methods / procedures, Arc welding kit and welding methods / procedures, Carryout welding, braxing, soldering

UNIT – III : PLUMBING SHOP

Plumbing tools and safe working practices, Pipe and pipe material, Pipe jointing accessories, Leak stopping material, Taps and cocks, Use of die, Jointing of pipes

REFERENCES :

1. Marine Engineering Practice - VikramGokhale / N.Nanda
2. Introduction to practical Marine Engineering (Volume 2 : Figures) – Alan L.Rowen, Raymond F. Gardner, Jose Femenia, David S.Chapman, Edwin G.Wiggins

PRACTICAL PAPER 2 : MARINE ENGINEERING WORKSHOP - II

UNIT – I:MAINTENANCE / DIESEL SHOP

Hand Tools and measuring tools, Nut, bolts and studs, Diesel engines, Auxiliary machinery, Lubrication, Valves

UNIT – II :ELECTRICAL SHOP

Hand tools and safe working practices, Cable and wires, Safety devices, Simple circuits, Battery maintenance

REFERENCES :

1. Marine Auxiliary Machinery – HD Mc George – 7th Edition
2. The running and maintenance of marine machinery – J Cowley
3. Introduction to practical marine Engineering (Volume 2: Figures) – Alan L.Rowen, Raymond F. Gardner, Jose Femenia, David S.Chapman, Edwin G.Wiggins
4. Electricity applied to Marine Engineering – W.Laws – 4th Edition