



## SRI VENKATESWARA COLLEGE OF ENGINEERING

## COURSE DELIVERY PLAN - THEORY

Page 1 of 6

Department of <u>MARINE ENGINEERING</u>		LP: MR 18403
B.E/B.Tech/M.E/M.Tech : <u>MARINE ENGINEERING</u>	Regulation: 2018	Rev. No: 00
PG Specialisation : MARINE		Date: 9.12.2019
Sub. Code / Sub. Name : MR 18403/ MARINE AUXILIARY MACHINERY- -I		
Unit : 1		

**Unit Syllabus:**

Layout of main and auxiliary machinery in Engine Rooms in different ships. Steam and condensate system, water hammering in pipes, Expansion joints in pipelines, Bilge – ballast, fuel oil bunkering and transfer system, bunkering procedure, precautions taken, fuel oil service system to main and auxiliary engines, lubricating oil and Engine cooling system to main and auxiliary engines, central cooling and central priming systems, control and service air system, domestic fresh water and sea water (Hydrophore) service system, drinking water system, fire main system.

**Objective:**

To impart knowledge on Ship's Engine Room Layout, Piping systems and fittings.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Layout of main and auxiliary machinery in Engine Rooms in different ships.	2-pf1-16	PPT/BB
2	Steam and condensate system, water hammering in pipes, Expansion joints in pipelines, Bilge – ballast	2-pg78-79 7-pg85-94	PPT/BB
3	Fuel oil bunkering and transfer system	2-pg82-83	PPT/BB
4	Bunkering procedure, precautions taken during bunkering	7-pg99-152 5-ch-VIII	PPT/BB
5	Fuel oil service system to main and auxiliary engines	2-pg51-70	PPT/BB
6	lubricating oil and Engine cooling system to main and auxiliary engines	2-pg74-77	PPT/BB
7	central cooling and central priming systems, control and service air system	2-pg11-15	PPT/BB
8	Domestic fresh water and sea water (Hydrophore) service system	2-pg 393	PPT/BB
9	Drinking water system, Fire main system	2-pg92-93	PPT/BB
Content beyond syllabus covered (if any):			

\* Session duration: 50 minutes



Sub. Code / Sub. Name: MR 18403/MARINE AUXILIARY MACHINERY-I

Unit : II

### Unit Syllabus:

Straight way cocks, right angled cock, "T" cock, spherical cock, Boiler gauge glass cock (cylindrical cock). Globe valves, SDNR valve, swing check valve (storm valve), gate valves, butterfly valves, relief valves, quick closing valves, pressure reducing valves, control valves and their usage. Change over valve chests, fuel oil transfer chest, valve actuators, steam traps. Packing, Insulation of materials, Types,- Various applications. Seals – purpose of bearing seal, description and application of non-rubbing seals and rubbing seals, simple felt seal, seals suitable for various peripheral speeds, V-ring seals, Lip seals. Filtration, filter elements basket strainers, duplex strainers, edge type strainers, auto-kleen strainers, back flushing strainers, magnetic filter, rotary filters, fine filters.

**Objective:** To impart knowledge on valves, cocks, packing, joints, filters and strainers

Session No *	Topics to be covered	Ref	Teaching Aids
1	Straight way cocks, right angled cock, "T" cock, spherical cock, Boiler gauge glass cock (cylindrical cock)	5-ch IV, internet source	PPT/BB
2	Globe valves, SDNR valve, swing check valve (storm valve), gate valves, butterfly valves, relief valves, quick closing valves, pressure reducing valves, control valves and their usage	2-pg112-126	PPT/BB
3	Change over valve chests, fuel oil transfer chest, valve actuators, steam traps	5-chapter XI	PPT/BB
4	Packing, Insulation of materials, Types,- Various applications	5-chapter IV	PPT/BB
5	Seals – purpose of bearing seal	2-pg149-150,170 2-pg268	PPT/BB
6	description and application of non-rubbing seals and rubbing seals, simple felt seal, seals suitable for various peripheral speeds, V-ring seals, Lip seals	2-pg192,268,149-150,170,269-270	PPT/BB
7	Filtration, filter elements basket strainers, duplex strainers	2-pg135-138	PPT/BB
8	Edge type strainers, auto-kleen strainers, back flushing strainers	2-pg135-138	PPT/BB
9	Magnetic filter, rotary filters, fine filters	2-pg135-138	PPT/BB
Content beyond syllabus covered (if any):			

\* Session duration: 50 minutes



Sub Code / Sub Name: MR 18403/ MARINE AUXILIARY MACHINERY-I

Unit no. III

**Unit Syllabus:**

Types of pumps for various requirements – their characteristics, performance and application in ships – centrifugal pumps – gear pumps – screw pumps and reciprocating pumps – care and maintenance of pumps, operation of all pumping systems on board such as bilge, ballast and cargo pumping operations.

**Objective:** To impart knowledge on various types of pumps and its applications on board.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Types of pumps for various requirements	7-pg79-84	PPT/BB
2	Characteristics, performance of pump and application in ships	4-pg177	PPT/BB
3	Centrifugal pumps/cavitation in pumps	2-pg146-462	PPT/BB
4	Gear pumps	2-pg171-172	PPT/BB
5	Screw pumps and reciprocating pumps	2-pg165-171 7-pg 81	PPT/BB
6	Care and maintenance of pumps	2-pg170-171	PPT/BB
7	Operation of all bilge pumping systems	5-chapter XI	PPT/BB
8	Operation of all ballast pumping systems	5-chapter XI	PPT/BB
9	Operation of all cargo oil pumping systems	5-chapter XI 2-pg 199-201	PPT/BB
<b>Content beyond syllabus covered (if any): Pump cavitation</b>			

\* Session duration: 50 minutes



Sub Code / Sub Name: MR 18403/ MARINE AUXILIARY MACHINERY-I

Unit no. IV

**Unit Syllabus:**

Principle of surface heat transfer – description, contact heat transfer, construction of shell and tube type – flat plate type, single and double pass – maintenance and repairs of same. Lubricating oil coolers, fuel oil heaters, fresh water coolers, compressed air coolers, Main Engine charge air cooler, Fresh water heaters, steam condensers, evaporators and condensers in refrigeration system – materials used in all the above heat exchangers, expansion allowance – temperature controls effect of air in the system – maintenance. Distillation of water, distilling equipment, problem of scale formation and method of controlling, methods of distillation, single effect and double effect shell type evaporator, low pressure vacuum type evaporator, flash evaporators, multiple effect evaporators-construction and operation salt water leaks and detection, reverse osmosis desalination plant, membranes, drinking water and treatment.

**Objective:** To develop theoretical knowledge on Construction details of Heat exchangers, Evaporators

Session No *	Topics to be covered	Ref	Teaching Aids
1	Principle of surface heat transfer – description, contact heat transfer		PPT/BB
2	Construction of shell and tube type – flat plate type, single and double pass – maintenance and repairs of same	2-pg4-14	PPT/BB
3	Lubricating oil coolers, fuel oil heaters, fresh water coolers, compressed air coolers, Main Engine charge air cooler, Fresh water heaters, steam condensers, evaporators.	5-ch-IV	PPT/BB
4	Condensers in refrigeration system – materials used in all the above heat exchangers, expansion allowance – temperature controls effect of air in the system – maintenance.	5-ch-XII	PPT/BB
5	Distillation of water, distilling equipment, problem of scale formation and method of controlling	2-pg502-503,	PPT/BB
6	Methods of distillation, single effect and double effect shell type evaporator	3-pg135	PPT/BB
7	Low pressure vacuum type evaporator, flash evaporators, multiple effect evaporators.	2-pg93-96	PPT/BB
8	Construction and operation salt water leaks and detection.		PPT/BB
9	Reverse osmosis desalination plant, membranes, drinking water and treatment.	2-pg28-31,2-pg99-101	PPT/BB
<b>Content beyond syllabus covered (if any):</b>			

\* Session duration: 50 minutes



Sub Code / Sub Name: MR 18403/ MARINE AUXILIARY MACHINERY-I

Unit no. V

### Unit Syllabus:

Hydraulic Telemotor system (Transmitter and receiver), Bypass valve – charging system, – hydraulic power unit – hunting gear heleshaw pump principle, construction and operation – pawl and ratchet mechanism, 2-ram and 4-ram steering gear – All electric steering gear, principle and operation – Hunting gear and emergency steering gear. Electro-hydraulic steering gear, Raphson and slide Actuators, Rotary vane steering gear – principle – construction – operation – safety features, relief, isolating and bypass valves, steering system regulations and testing – trouble shooting – rectification maintenance. Navigational safety of a ship – case history, cause and /or errors – how to avoid rudder restraining, general requirements – requirements for large tankers and gas carrier, additional requirements (electrical) definitions – controls – automatic system, general arrangement – rudder and Pintle, rudder wear down – measurement of clearances.

**Objective:** To study the Ship's steering systems.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Telemotor system (Transmitter and receiver), Bypass valve – charging system, – hydraulic power unit – hunting gear heleshaw pump principle, construction and operation – pawl and ratchet mechanism	2-pg295-299 2pg-293-294	PPT/BB
2	2-ram and 4-ram steering gear – All electric steering gear, principle and operation – Hunting gear and emergency steering gear	2-pg286-313	PPT/BB
3	All electric steering gear, principle and operation – Hunting gear and emergency steering gear.	2-pg295- 209,301-302	PPT/BB
4	Electro-hydraulic steering gear, Raphson and slide Actuators, Rotary vane steering gear	2-pg288-290	PPT/BB
5	Principle – construction – operation – safety features, relief, isolating and bypass valves.	2-pg299	PPT/BB
6	Steering system regulations and testing – trouble shooting – rectification maintenance	2-pg312-313	PPT/BB
7	Navigational safety of a ship – case history, cause and /or errors – how to avoid rudder restraining	Internet source	PPT/BB
8	General requirements – requirements for large tankers and gas carrier, additional requirements (electrical)	4-pg 183- 202 8-pg63-80	PPT/BB
9	Definitions – controls – automatic system, general arrangement – rudder and Pintle, rudder wear down – measurement of clearances	2-pg311, 2-pg286-288	PPT/BB
Content beyond syllabus covered (if any):			

\* Session duration: 50 minutes



## SRI VENKATESWARA COLLEGE OF ENGINEERING

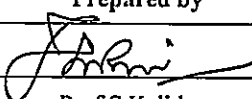
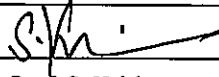
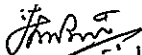
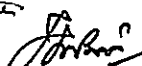
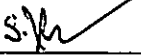
## COURSE DELIVERY PLAN - THEORY

**TEXT BOOKS:**

- 1) D.W. Smith, "Marine Auxiliary Machinery", 6th Edition, Butter worths, London, 1987.
- 2) H.D. McGeorge, "Marine Auxiliary Machinery", 7th Edition, Butter worth, London, 2001.
- 3) Reed's "General engineering Knowledge for marine engineers", Reprinted -1999

**REFERENCE:**

- 4) Vikram Gokhale, N. Nanda, "Advanced Marine Engineering Knowledge Vol. II", 2nd Edition, Engineer Enterprises, Mumbai, 2001.
- 5) Vikram Gokhale & N. Nanda, "Marine Engineering Knowledge for Junior Engineers", 3rd Edition, Engineer Enterprises, Mumbai, 1999.
- 6) T.B. Srinivasan, "Marine Machineries - Operation & Maintenance", 1st Edition, the Institute of Marine Engineers, India.
- 7) Alan L. Rowan & Raymond "Introduction to practical marine engineering" Vol 1,2006.
- 8) Vikram Gokhale, N. Nanda "Engineering knowledge for Masters and Mates" "Vol. II", 2nd Edition, Engineer Enterprises, Mumbai, 2001

	Prepared by	Approved by
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Designation	Professor & Assistant Head of the department	Professor & Assistant Head of the department
Date	9.12.2019	9.12.2019
Remarks *	Since there is no change in Syllabus, the same lesson plan is followed for 2020-2021. 	
Remarks *	Since there is no change in Syllabus, the same lesson plan is followed for 2020-2021 even semester.  	

\* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD