SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of MARINE ENGINEERING	LP: MR 18403 Rev. No: 00 Date: 9.12.2019
B.E/B.Tech/M.E/M.Tech : MARINE ENGINEERING Regulation: 2018 PG Specialisation : MARINE Sub. Code / Sub. Name : **MR 18404/ MARINE BOILERS ANS STEAM TURBINES** Unit : 1	

Unit Syllabus: MARINE BOILERS

Construction & Working of Scotch boiler, Cochran boiler. Water tube boiler: - Babcock Wilcox boiler, foster wheeler, Thimble tube boiler, Double evaporation boilers, composite boilers, Lamont exhaust gas boiler. Advantages of water tube boilers. Stresses in boilers and corrosion in steam system.

Objective: To provide knowledge to the students about different type of marine boilers.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Construction and working of scotch boiler	4-pg1-5	PPT/BB
2	Construction and working of Cochran boiler	1-pg10	PPT/BB
3	Construction and working of Babcock and Wilcox boiler	1-pg36-38	PPT/BB
4	Construction and working of foster wheeler	1-pg35-42	PPT/BB
5	Construction and working of thimble tube boiler	1-pg12-13	PPT/BB
6	Construction and working of Double evaporation boiler/ Composite boiler	4-pg45	PPT/BB
7	Construction and working of Lamont exhaust gas boiler	1-pg23-24	PPT/BB
8	Advantages of water tube boilers	1-pg27-28	PPT/BB
9	Stresses in boilers and corrosion in steam system	1-pg1-6	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

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Sub. Code / Sub. Name: **MR 18404/ MARINE BOILERS AND STEAM TURBINES**

Unit : II

Unit Syllabus: BOILERS MOUNTINGS AND FEED SYSTEMS

Construction and working of safety valves: - improved high lift safety valve, full bore safety valve, construction and working of gauge glass tubular type, double plate type and I-Gema remote indicator, procedure for blowing through the gauge glass, feed check valve, automatic feed regulator and manhole door construction. Feed system- Open and close feed system, hot well, cascade tank, observation tank, super heater and its general arrangements. Simple basic treatment for the Feed water.

Objective: To provide knowledge to the students on the safety valves and the boiler feed system.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Construction and working of improved high lift safety valves	1-pg83-85	PPT/BB
2	Construction and working of full bore safety valves	1-pg85-86	PPT/BB
3	Construction and working of gauge glass- Tubular type	1-pg70-73	PPT/BB
4	Construction and working of gauge glass- Double plate type	1-pg76-78	PPT/BB
5	Construction and working of gauge glass- I-Gema Remote gauge glass	1-pg78-79	PPT/BB
6	Procedure for blowing through the gauge glass	1-pg93,88-90	PPT/BB
7	Feed check valve, automatic feed regulator and manhole door construction.	1-pg3-4,106 4-pg219 3pg-25-231	PPT/BB
8	Feed system- Open and close feed system, hot well, cascade tank, observation tank, super heater and its general arrangements	1-pg100 1-pg49-66	PPT/BB
9	Simple basic treatment for the Feed water.	4-pg69	PPT/BB

Content beyond syllabus covered (if any):

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Sub Code / Sub Name: **MR 18404/ MARINE BOILERS AND STEAM TURBINES**

Unit no. III

Unit Syllabus: COMBUSTION IN BOILERS

Theory of combustion in boiler, construction of various types of burners -pressure jet, blast jet, rotating cup type burner, excess air requirements & furnace refractory materials. Boiler fuel system, construction and operation of soot blowers

Objective: To provide knowledge to the students in on the marine boiler combustion and the fuel oil system

Session No *	Topics to be covered	Ref	Teaching Aids
1	Theory of combustion in boiler	1-pg91-93, 3-pg2,45	PPT/BB
2	Construction of pressure jet	1-pg93	PPT/BB
3	Construction of blast jet	1-pg96	PPT/BB
4	Construction of rotating cup type burner	1-pg95	PPT/BB
5	Excess air requirements	1-pg97 3-pg53	PPT/BB
6	Furnace refractory materials	1-pg46-47,101-102	PPT/BB
7	Boiler fuel system	1-pg99	PPT/BB
8	Construction and operation of soot blowers	1-pg103,114-115	PPT/BB
9	Revision	*	PPT/BB

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

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Sub Code / Sub Name: **MR 18404/ MARINE BOILERS AND STEAM TURBINES**

Unit no. IV

Unit Syllabus: OPERATION & MAINTENANCE OF BOILER

Boiler blowing down procedure, manhole door opening procedure, tube renewals, procedure for steam raising from cold, boiler operating procedures, inspection and survey of boilers, safety valve over hauling, soot blower-fixed type, retractable soot blower, soot blowing procedure, accumulation pressure testing and hydraulic pressure testing.

Objective:

To provide knowledge to the students about boiler operation and its maintenance.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Boiler blowing down procedure	1-pg81-90	PPT/BB
2	Manhole door opening procedure, tube renewals	1-pg8-10	PPT/BB
3	Procedure for steam raising from cold	3-pg37 1-pg105,107	PPT/BB
4	Boiler operating procedures	3-pg49	PPT/BB
5	Inspection and survey of boilers	1-pg106	PPT/BB
6	Safety valve over hauling	*	PPT/BB/ video
7	Soot blower-fixed type, Soot blowing procedure	1-pg102-102	PPT/BB
8	Retractable soot blower	Internet	PPT/BB
9	Accumulation pressure testing and hydraulic pressure testing	1-pg107	PPT/BB

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

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Sub Code / Sub Name: **MR 18404/ MARINE BOILERS AND STEAM TURBINES**

Unit no. V

Unit Syllabus: MARINE STEAM TURBINES

Steam turbines- working principle and construction of impulse turbine and reaction turbine. Construction of condensers. Material used in various components such as blades, rotors, casing, nozzle etc…essential boiler water testing

Operation and maintenance of turbine-speed and power control, throttle valve control and nozzle control, emergency operations of turbines, emergency control, vibration in marine steam turbine drain system, turbine gland system, warming through a turbine plant. Turbine bearing and lubrication system

Objective: To provide knowledge to the students about the construction, operation and maintenance of turbines.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Working principle and construction of impulse turbine and reaction turbine	3-pg147-151,99,163	PPT/BB
2	Construction of condensers	3-248-254	PPT/BB
3	Material used in various components such as blades, rotors, casing, nozzle	3-pg157,163,4781	PPT/BB
4	Essential boiler water testing	3-pg69	PPT/BB
5	Speed and power control, throttle valve control and nozzle control, emergency operations of turbines, emergency control	3-pg104,160-161	PPT/BB
6	vibration in marine steam turbine drain system	7-pg82	PPT/BB
7	Turbine gland system, warming through a turbine plant	3-pg144	PPT/BB
8	Turbine bearing and lubrication system	3-pg181	PPT/BB
9	Revision	*	PPT/BB
Content beyond syllabus covered (if any):			

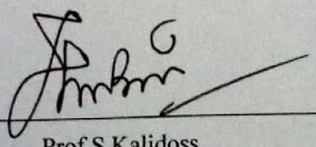
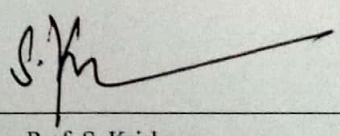
* Session duration: 50 minutes

TEXT BOOKS:

1. GTH. Flanagan," Marine Boilers" 3rd Edition, Butter Worth, London, 2001.
2. J.H. Milton & R.M. Leach, "Marine steam boilers", 4th edition, butter worth, London, 1980.
3. Thomas D. Morton, "Reed's Steam engineering knowledge for engineers", Vol 9, 2011.

REFERENCE:

4. L. Jackson & T.D. Morton, "General Engineering Knowledge for marine Engineers", 4th Edition.
5. William J. Kearton, D. Eng. "Steam turbine operation".
6. Marine engineering practice" operation of machinery in ships: Steam turbine, Boilers and auxiliary plant" Vol 2, 2000
7. K.M.B. Donald, "Marine steam turbines", Institute of marine engineer, 1977
8. Marine engineering series, "Marine steam engines and turbines", 4th edition, 1980
9. A.K. Ramanujam, "Marine Boilers".
10. Engineering knowledge and general boiler notes.

	Prepared by	Approved by
Signature		
Name	Prof.S.Kalidoss	Prof. S. Krishnan
Designation	Professor & Assistant Head of the department	Professor & Assistant Head of the department
Date	9.12.2019	9.12.2019
Remarks *:		
Remarks *:		

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