MARINE ENGINEERING

By

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Lecture 1

Course Overview

hello and welcome to the course Marine Engineering this is a 12-week course that will be online through NPTEL and SWAYAM portal the marine engineering course content thermodynamic basic laws how heat transfer will occur what is the closed system open system what is entropy enthalpy different units heat transfer basics fundamentals of heat transfer it will be containing heat exchanger, then I'll be giving some basic ideas about turbo machinery pumping systems because lots of pumps will be there on board on shaping machinery where pumps will be transferring fluid from one point to another point or it will be increasing pressure of certain aspect for example if your boiler system you need higher pressure inlet pressure feed water so, in that case, you need pump or deck cleaning you need a pump or you need a pump for your refrigeration system running ors other systems running and there will be marine boilers also boilers means you are boiling water and you are increasing pressure and temperature and creating steam so that steam will be used for running turbine or some other purposes

the steam engine I'll be discussing different types of engines should be there and how they work what are the different calculations I'll be talking about IC engines so internal combustion engines gas turbine engines and nuclear power engines so different types of engines will be there to properly assist shipping system this is just newer systems are also coming but basically i'll focus on the original or basic engines such as two stroke four stroke engines different fuel different lubricating properties turbochargers, cooling systems. So whenever you have any ic engine that will generate lots of heat. And if you don't have a cooling system, then heat generation would be creating an issue or machine can fail. So how to reduce temperature?

What are the different mechanisms? Whether air cooling engine will be working or water cooling? Water, maybe seawater you can take and you can cool your engine so those things can work. And another system is refrigeration system or HV system, heating, ventilation,

and air conditioning system. In a refrigeration system, when you are working for passenger ship design and running also, so that time you need refrigeration or cold temperature making system.

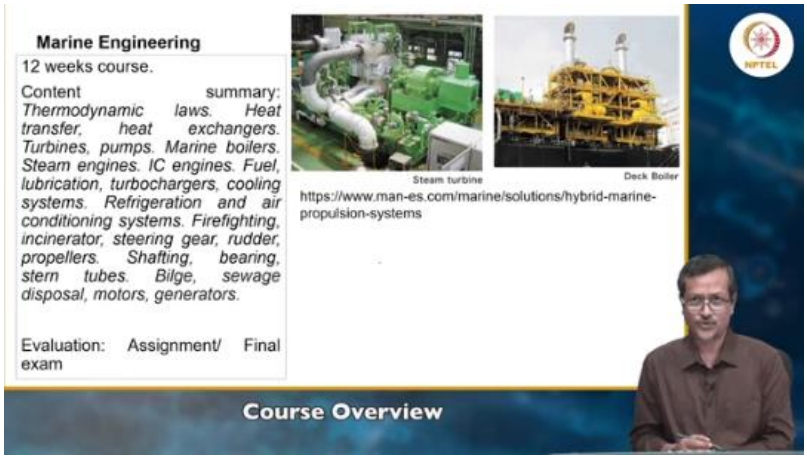
In the refrigeration system, you will have the throttling system, you will have a compression system, you have an evaporator, you have condenser, you have heat exchangers. and you are getting low temperature and what are the different criteria how to calculate it how to select it so you will go through this course you have you will be learning about the different cooling systems the your psychometric chart how to read it how to maintain temperature and humidity level so that human or the people staying on board or recreational people who are going for this touring or going from one place to another place so they need some comfortable temperature and humidity so how to maintain that one i'll discuss i'll also discuss if there is any fire how to handle it you are a marine engineer or you you are designing engineer design engineer shipping for let's say naval architecture system you are designing or marine engineering system you are designing so then you have to think about fire if there is any fire then how to handle it okay you will have incinerator like you have lots of waste on board let's say people are there so there will be waste of food and many other thing Then how to dispose it?

So there will be some incinerator system. So what are the different incinerator systems are there? I will discuss about steering gear. I will discuss about radar, propeller, shafting, bearing. Engine is there.

Propeller is there. Propeller means it will be propelling ship from one place to another place. Engine to propeller. How to connect engine to propeller? Whether can you connect directly or should we connect through one shafting system, there will be gearing mechanism and other mechanism or will be producing electricity.

So, that electricity will be running one motor. So, motor will be driving your propeller system. The rudder will be there, rudder will be just maneuvering your system or ship. then there will be bilge water sewage disposal and I will be discussing something about motor generator also so this will be the whole syllabus of the course and I will be discussing one by one in 12 weeks so first we will start with thermodynamics laws and basic heat transfer system thermodynamics because this is the basic of the whole course okay the basically the course will contain mechanical component fluid mechanics and mix of this one and the course will be evaluated through assignment and final examination will also be there so

those will be registering the course so they will have to submit assignment and they will have to go through online exam so based on that they will be getting certificate



whenever you will be studying, you have to follow certain books because this is undergrad course. the books will be like a Harrington marine engineering book is there, D.A. Taylor introduction to marine engineering, low speed marine diesel and ocean engineering, Wiley series book is there, any standard textbook and thermodynamics. Sometimes I will be taking the book of P.K. Nag P.K. Nag.

basic and applied thermodynamics basic and applied okay so many other books I will be following so whenever I will be following any different course different videos or any text document anything I will be giving link so the student whenever they are studying they can go further details into the book further details from the book or the link whichever I will be providing There will be many other reference books also students can follow like Pounder's Marine Diesel Engine and Gastrovene Engine, Reed's Motor Engineering Knowledge, and Thomas D. Morton's Marine Auxiliary Machinery. there are several books available, but every book details you do not have to study. Whatever I will be teaching based on that you can go through the specific portion and you can study.

W1- Marine Engineering – Introduction, thermodynamics

Text Books:

1. Harrington, R.L. Marine Engineering, SNAME, New York (1992)
2. Taylor, D.A., Introduction to Marine Engineering, Butterworths, London(1983)
3. Woodward, J.B., Low Speed Marine Diesel, Ocean Engineering, A Wiley series(1981)
4. Any standard text books on thermodynamics

4) PK Nag, Basic & Applied Thermodynamics

Reference books

1. Pounder's Marine diesel engines and Gas turbines edited by Dough Woodyard, Elsevier Ltd.
2. Reed's Motor Engineering Knowledge for Marine Engineers
3. Thomas D Morton Marine Auxiliary Machinery 7th edition.

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