

# Noorul Islam Centre for Higher Education

(Deemed to be University u/s 3 of the UGC Act 1956)

Kumaracoil, Thuckalay, Kanyakumari District - 629 180

Accredited by NAAC with 'A' Grade



## Student Performance and Learning Outcomes

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MR22 BE MARINE ENGINEERING



## Student Performance and Learning Outcomes

**MR22 BE MARINE ENGINEERING**

<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
<b>SEMESTER II</b>		
1.	MR2206	Seamanship, Elementary Navigation & Survival at sea
2.	MA2209	Mathematics – II
3.	MR2207	Applied Thermodynamics - I
4.	MR2208	Strength of Materials – I
5.	CS2208	Computer Science
6.	MR2209	Engineering Mechanics – II
7.	MR2210	Engineering & Machine Drawing
<b>SEMESTER IV</b>		
8.	MR2216	Ship Structure & Construction
9.	MR2217	Marine Boilers & Steam Engineering
10.	MR2218	Mechanics of Machines – II
11.	MR2219	Electrical Machine - II
12.	MR2220	Fluid Mechanics - I
13.	MR2221	Marine Heat Engines & Marine Air Conditioning
14.	MR2222	Practical Marine Automation
<b>SEMESTER VI</b>		
15.	MR230	Ship Fire Prevention & Control
16.	MR231	Marine Internal Combustion Engine – II
17.	MR232	Marine Electrical Technology
18.	MR233	Marine Auxiliary Machines – II
19.	MR234	Naval Architecture – II
20.	MR2A3	Environmental Science & Technology.
<b>SEMESTER VIII</b>		
21.	MR235	Ship Operation & Management
22.	MR236	Advanced Marine Control Engineering & Automation
23.	MR237	IMO & Maritime Conventions
24.	MR238	Advanced Marine Technology
25.	MR239	Engine Room Management
26.	MR2A7	Renewable Energy Sources and applications
27.	MR240	Marine Machinery & System Design

MR2206 - Seamanship, Elementary Navigation & Survival at sea	
CO1	The Student Will able to understand Ship's Department, general ship knowledge and nautical terms like Poopdeck, Forecastle, Bridge etc.
CO2	Student Will able to understand Ropes, knots and moorings and care and maintenance of ropes, canvas and its uses, anchors and cables.
CO3	Student Will able to understand principle of stars, navigational compass, sextant, navigational equipment's, storage and securing arrangements of boats.
CO4	Student Will able to understand manning of lifeboats, muster lists, life raft, pyrotechnique survival difficulties action on boarding life raft.
CO5	Student Will able to understand MARPOL, Convention, annexes, pollutions, SOLAS, STCW, ISPS, Conventions, knots bents and hitches practices.

MA2209 - Mathematics – II	
CO1	To find the Fourier series representation of a function of one variable and to find half-range Fourier series for even/odd functions.
CO2	Develop the concepts of Laplace transformation & inverse Laplace Transform with its property to solve partial Differential equation and Ordinary Differential Equation with given boundary conditions
CO3	Classify differential equations according to certain features, Solve first order linear equations and nonlinear equations of certain types and interpret the solutions and to solve second and higher order linear differential equations with constant coefficients and construct all solutions from the linearly independent solutions
CO4	Demonstrate understanding of basic probability axioms and rules, the Bayes' theorem, the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables and how to calculate probabilities, derive the marginal and conditional distributions of bivariate random variables and correlation functions, to describe relationships between different experimental conditions.
CO5	Define basic discrete and continuous distributions, be able to apply them and simulate them in simple cases.

MR2207 - Applied Thermodynamics - I	
CO1	The students will be able to acquire knowledge about the second law of thermodynamics
CO2	To understand the application in steam cycles such as Rankine & modified cycles.
CO3	Students gets knowledge on steam engine and to develop problem solving skill
CO4	To develop the understanding skills on application of Air compressors.
CO5	Understand the application of Thermodynamics laws in gas mixtures & Psychrometrics

MR2208 - Strength of Materials – I	
CO1	To impart knowledge in stress & strain in simple and composite members under external load and strain energy stored in members.
CO2	To develop knowledge in drawing the shear force and bending moment diagram for various types of beams with various loads.
CO3	To acquire knowledge in thin cylindrical shells subjected to internal pressure, strengthening by wire and to study the strength of welded joints.
CO4	To impart knowledge of designing various types of beams with various types of loads which can resist bending and shearing stresses.
CO5	To develop knowledge of designing solid and hollow shafts and to calculate and design helical springs.

CS2208 - Computer Science	
CO1	Explain the different problem solving techniques
CO2	Design and Understand the different office automation tools
CO3	Introduce the different programming paradigms of C.
CO4	Design C Programs for problems.
CO5	Write and execute C programs for simple applications.

MR2209 - Engineering Mechanics – II	
CO1	Student Will able to understand the concepts of friction, limiting friction, friction in threaded screws, pivots and collars.
CO2	Student Will able to get the knowledge of rotation concepts, torque equation, kinetic energy of rotation and fluctuation of energy.
CO3	Student Will able to acquiring the knowledge of SHM, Time period of simple pendulum and compound pendulum.
CO4	Student Will able to acquire the knowledge of working principle of governors, types, sensitiveness, stability and power of governors.
CO5	Student Will able to acquire the knowledge of different types of belt drives, brakes and dynamometers.

MR2210 - Engineering & Machine Drawing	
CO1	The students will be able to acquire knowledge about first angle and third angle orthographic projections as well as various sectioning of a component and sectional assembly drawing of simple components.
CO2	The students will be able to acquire knowledge about isometric and oblique projections of various parts.
CO3	The students will be able to acquire knowledge about important types of interpenetration of the different combinations of the geometrical solids.
CO4	The students will be able to acquire knowledge about various thread details and their general convention in engineering drawing.
CO5	The students will be able to acquire knowledge about various nuts, bolts, studs and various types of locking arrangement of nuts.

MR2216 - Ship Structure & Construction	
CO1	Students will be able to understand the Ships Terms and Stresses in ship's structure.
CO2	Students will be able to understand the Bottom & Side Framing and Shell & Decks
CO3	Students will be able to understand the Fore-End and After-End- Arrangements.
CO4	Students will be able to understand the Load line and Tonnage and Shipyard Practice.
CO5	Students will be able to understand the Ship Types.

MR2217 - Marine Boilers & Steam Engineering	
CO1	Students will be able to understand the basics of the boiler design.
CO2	Students will be able to understand the safety features of boiler.
CO3	Students will be able to understand the turbine layout of plants.
CO4	Students will be able to understand the gear construction and condensers.
CO5	Students will be able to understand the turbine drain system and alignment.

MR2218 - Mechanics of Machines – II	
CO1	Student Will able to acquire the knowledge of balancing of rotating and reciprocating masses to minimize the pressure on main bearing when engine is running.
CO2	Student Will able to acquire the knowledge of simple harmonic motion, spring in series and parallel, simple and compound pendulum.
CO3	Student Will able to acquire the knowledge of Natural frequency of free transverse and longitudinal vibrations and to find them using problems.
CO4	Student Will able to understand the concepts of single, two and three rotor system.
CO5	Student will able to understand the concept of free damped vibration and forced damped vibration.

MR2219 - Electrical Machine - II	
CO1	Understand and explain the principle of operation and performance of synchronous machine, three phase and single phase induction motor
CO2	Analyse the response of AC synchronous machine, three phase and single phase induction motor.
CO3	Formulate and then analyses the working of any electrical AC machines under no load and loaded conditions
CO4	Calculate load of AC machine and induction motor for a given application and then select the suitable specification of electrical machine
CO5	Troubleshoot the operation of AC synchronous machine, three phase and single phase induction motor

MR2220 - Fluid Mechanics – I	
CO1	To acquire knowledge about basics on properties of fluid & use of dimensional analysis
CO2	To get knowledge on hydrostatic forces on different objects & stability of bodies
CO3	To understand dynamic properties of fluid, discharge and various energies
CO4	To understand different losses in fluid flow & conditions for max. Power transmission.
CO5	To get Knowledge on fluid properties such as viscous, laminar, Vortex etc.

MR2221 – Marine Heat Engines & Marine Air Conditioning	
CO1	The students will be able to acquire knowledge about various vapour power cycles with their effect on steam and gas plants.
CO2	The students will be able to acquire knowledge about types of steam turbines, compounding in turbines, degree of reaction, governing in turbines, efficiency and their importance.
CO3	The students will be able to acquire knowledge about various cycles of gas turbine plant [Ex: C-B-T cycle, constant volume .....]including stagnation conditions.
CO4	The students will be able to acquire knowledge about working and uses of axial flow compressor with their parameter (i.e., Mach number, slip factor.....)and various stages of compressor
CO5	The students will be able to acquire knowledge about working of marine refrigeration and A/C plants and their role and uses in ship carriers along with their psychometric properties of air.

MR2222– Practical Marine Automation	
CO1	Learn about basics of Process control, types of control and system lags
CO2	Learn about different types of controllers, both electronic and pneumatic type, Relays
CO3	Gain knowledge about actuators, positioners, converters and transducers
CO4	Develop skills in selection of measuring devices for pressure, temperature, flow and level, also indicators
CO5	Gain knowledge about various instruments and controllers, also applications in ships

MR230 - Ship Fire Prevention & Control	
CO1	Student Will able to understand Fire chemistry, elements in fire triangle and tetrahedron and fire extinguishing agents.
CO2	Student Will able to understand the fire safety norms to be followed in ship's construction and importance of construction rules made by administration and class.
CO3	Student Will able to understand the safety precautions on different classes of ships, fire detection, safety systems onboard ships.
CO4	Student Will able to understand the firefighting system onboard ships and its use, operation and firefighting installation on tankers. Testing and recharge of extinguishers
CO5	Student Will able to understand fire control techniques and procedure for firefighting operations in Port and Dry dock fires and chemical carriers and tankers

MR231– Marine Internal Combustion Engine – II	
CO1	Students will be able to understand the Forces and Stresses Fuel pumps and metering devices
CO2	Students will be able to understand the Maneuvering systems & Indicator diagrams.
CO3	Students will be able to understand the Lubrication systems& Medium Speed Engines.
CO4	Students will be able to understand the Gas Turbines& Maintenance of Diesel Engines.
CO5	Students will be able to understand the Trouble Shooting in Diesel Engines.

Marine Electrical Technology – MR232	
CO1	Understand the methods of power generation and how it operates
CO2	Study about the distribution system and then analyses the characteristics of electrical machines.
CO3	Apply various devices for performing the operations of onboard ship
CO4	Evaluate the faults occurred in electrical machines used in onboard ship.
CO5	Remembering all the safety precautions against fire, shock and hazards.

MR233– Marine Auxiliary Machines – II	
CO1	Students will be able to understand the knowledge of refrigeration cycle.
CO2	Students will be able to understand the air conditioning system in cargo holdings.
CO3	Students will be able to understand the Ventilation and Noise and vibrations.
CO4	Students will be able to understand the nature of oil used in marine system.
CO5	Students will be able to understand the lubrication in marine system.

MR234– Naval Architecture - II	
CO1	Students will be able to understand the terminology of propellers, types of propeller.
CO2	Students will be able to understand the blade element theory, model tests of propeller.
CO3	Students will be able to understand the action of the rudder in turning a ship action.
CO4	Students will be able to understand the strength of the ship.
CO5	Students will be able to understand the waves and six degree of freedom of ship.

MR2A3 – Environmental Science & Technology	
CO1	Students will be able to understand the terminology of propellers, types of propeller.
CO2	Students will be able to understand the blade element theory, model tests of propeller.
CO3	Students will be able to understand the action of the rudder in turning a ship action.
CO4	Students will be able to understand the strength of the ship.
CO5	Students will be able to understand the waves and six degree of freedom of ship.

MR235– Ship Operation & Management	
CO1	Students will be able to understand about chartering and charter parties
CO2	Students will be able to understand the bill of lading and its importance
CO3	Students will be able to understand about marine insurance and importance
CO4	Students will be able to understand organizational structure and about commercial
CO5	Students will be able to understand commercial operation and seaman welfare



MR236 - Advanced Marine Control Engineering & Automation	
CO1	Learn about basics of control systems, modelling of different systems and analysis of system stability
CO2	Learn about different types of controllers, both electronic and pneumatic type, Relays, Programmable Logic Controllers
CO3	Gain knowledge about actuators, positioners, converters and transducers
CO4	Develop skills in understanding and identifying converters and transducers for signal transmission
CO5	Gain knowledge about various instruments and controllers, also applications in ships

MR237– IMO & Maritime Conventions	
CO1	Students will be able to understand the various national and international bodies, statutory bodies in shipping, functions of classification societies and professional bodies, STCW & requirements of training
CO2	Students will be able to understand the principles of watch keeping training and competence of crew, special requirements for tankers bulk carriers and guidance for the in charge of engineers watch.
CO3	Students will be able to understand the design and requirement of equipment for different categories of ship, operation and maintenance of ships, Port State and Flag State Control Inspection and updating of proficiency level .
CO4	Students will be able to understand the various certificates to be carried on board ships, IMO conventions on SOLAS, MARPOL, LOAD LINE, STCW, TONNAGE, COLREG, ISPS, ISM, ILO and issue of DOC and SMC for Ships and Company as well as relevants to seafarers.
CO5	Students will be able to understand the requirements of statutory- surveys and class surveys and related certificates for sea going ships, under water inspection, hazards of cargo and pollution prevention.

MR238 - Advanced Marine Technology	
CO1	Students will be able to understand the design aspects of LNG/LPG vessels.
CO2	Students will be able to understand the design aspects of chemical tanker.
CO3	Students will be able to understand the design aspects of oil tanker and IG system.
CO4	Students will be able to understand the design aspects of car carrier and survey.
CO5	Students will be able to understand the latest technology of IC engine

MR239 – Engine Room Management	
CO1	Students will be able to understand the operation and maintenance of main engine, boiler and auxiliary machineries.
CO2	Students will be able to understand the emergency operation of main engine, boiler and auxiliary machineries and spare parts management.
CO3	Students will be able to understand the performance of main engine, various trouble shooting and crew management.
CO4	Students will be able to understand engine room watch keeping, maintaining engine room log and types of maintenance.
CO5	Students will be able to understand various deck machineries, their operation and maintenance and dry docking.

MR2A7 – Renewable Energy Sources and applications	
CO1	Discriminate the environmental aspects of non conventional energy resources
CO2	Know the need of renewable energy resources historical and latest developments.
CO3	Acquire the knowledge on solar cells and wind power
CO4	Acquire the knowledge on bio fuels and their availability and uses
CO5	Compare solar wind and bio energy systems, their prospects , advantages and limitations.

MR240 - Marine Machinery & System Design	
CO1	Students will be able to understand the various design considerations, manufacturing methods for a component.
CO2	Students will be able to know the design and drawing of marine machinery components such as Flywheel, piston, connecting rod, bearing, springs etc...
CO3	Students will be able to know about the marine auxiliary machineries.
CO4	Students will be able to know the marine diesel engine and its components as well as steam and gas turbine plants.
CO5	Students will be able to know about the SOLAS.