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

ME22 BE MECHANICAL ENGINEERING

Student Performance and Learning Outcomes

ME22 BE MECHANICAL ENGINEERING

ProgrammeOutcome - PO	
PO-A	Improve the ability of applying knowledge gained from subjects learned.
PO-B	Increase the ability to design and conduct experiments as well as analyzing and interpreting data.
PO-C	Increase the ability to design a system, component or process to meet desired needs.
P0-D	Increase the ability to familiarize multidisciplinary skills and ethical values.
PO-E	Improves personal and social responsibilities to respond human needs like environmental protection.
PO-F	Engages lifelong learning including the ability to show proficiency in current technologies.
PO-G	Increases the ability of communicating effectively.
PO-H	Increases the ability of working collaboratively as a team and serves the role of team leader innovatively.
PO-I	Understanding the impact of engineering solutions in global, economic, environmental & societal context.
PO-J	Ability to demonstrate critical thinking and the usage of appropriate strategies, tools to conduct investigation in appropriate manner.
PO-K	Improves the skill of applying techniques and modern engineering tools necessary for project development.
PO-L	Understanding management policies/principles and apply those to manage the projects in the context of technological change.

PROGRAM SPECIFIC OUTCOME (PSO)	
PSO 1	An ability to identify, analyze and solve engineering problems relating to mechanical systems together with allied engineering streams.
PSO 2	An ability to build the nation, by imparting technological inputs and managerial skills to become Technocrats and Entrepreneurs, build the attitude of developing new concepts on emerging fields and pursuing advanced education.

Sl.No	Subject Code	Subject Name
		SEMESTER II
1.	EG2102	Technical English – II
2.	MA2102	Engineering Mathematics – II
3.	BS2103	Environmental Science
4.	ME2201	Engineering Graphics
5.	ME2202	Manufacturing Processes – I
6.	EE2217	Electrical Technology
7.	EE2281	Electrical Technology Laboratory
8.	ME2271	Geometric Modeling Laboratory - I
9.	ME2272	Manufacturing Processes Laboratory - I
		SEMESTER IV
10.	MA2204	Statistics and Numerical Methods
11.	ME2225	Thermal Engineering
12.	ME2216	Automobile Engineering
13.	ME2209	Kinematics of Machinery
14.	ME2210	Strength of Materials
15.	ME2211	CAD/CAM
16.	ME2277	Thermal Engineering Laboratory - I
17.	ME2278	Strength of Materials Laboratory
18.	ME2279	Geometric Modeling Laboratory - II
19.	ME2280	Manufacturing Processes Laboratory – III
		SEMESTER VI
20.	IT1212	Cyber Security
21.	ME1216	Finite Element Analysis
22.	ME1214	Mechanical Measurements and Metrology
23.	ME1215	Computer Aided Manufacturing
24.	ME1217	Machine Design II
25.	FS1212	Nuclear Engineering and Safety
26.	ME1283	Mechanical Measurements Lab
27.	ME1282	Simulation Laboratory - II
28.	ME1284	Metrology Laboratory
29.	ME12P1	In plant Training & Seminar
		SEMESTER VIII
30.	ME1223	Optimization Techniques for Production Management
31.	ME12D5	Refrigeration and Air Conditioning
32.	ME12C3	Entrepreneurship Development
33.	ME12A8	Welding Technology
34.	ME12P5	Project Work

EG2102- Technical English – II	
CO1	Learners should be able to speak convincingly, express their opinions clearly using appropriate communicative strategies.
CO2	Learners should be able to write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
CO3	Learners should be able to read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
CO4	Learners should be able to listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
CO5	Learners should be able to initiate a discussion, negotiate, argue using appropriate communicative strategies.

Sub Code – Sub Name: MA2102- Engineering Mathematics – II	
CO1	Students would have learnt techniques in solving ordinary differential equations that model engineering problems
CO2	Students would have learnt the concepts of vector calculus, needed for problems in all engineering disciplines.
CO3	Students would have learnt the standard techniques of complex variable theory so as to apply them with confidence in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
CO4	Students would have learnt the purpose of using Laplace transforms to create a new domain in which it is easier to handle the problem that is being investigated
CO5	Students would have learnt techniques in complex integration and further evaluation of integrals by Cauchy's theorem.

BS2103- Environmental Science	
CO1	Upon successful completion of this course, the students will be able to find and implementing scientific, technological, economic and political solutions to environmental problems.
CO2	Upon successful completion of this course, the students will be able to study the interrelationship between living organism and environment.
CO3	Upon successful completion of this course, the students will be able to appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
CO4	Upon successful completion of this course, the students will be able to study the dynamic processes and understand the features of the earth's interior and surface.
CO5	Upon successful completion of this course, the students will be able to study the integrated themes and biodiversity, natural resources, pollution control and waste management.

ME2201- Engineering Graphics	
CO1	Familiarize with the fundamental standards applied in engineering graphics and perform free hand sketching of basic geometrical construction and multiple views of object.
CO2	Project orthographic projection of points, line and plane surfaces.
CO3	Understand and draw the projection of solids and its sections.
CO4	Visualize and project isometric views.
CO5	Understand and draw development t of different solids and project orthographic projection of various machine parts.

ME2202- Manufacturing Processes – I	
CO1	Acquire the basic knowledge of all manufacturing processes used on shop floor of any industry
CO2	Decide the appropriate production process for any product upon the number of options available to optimize production process.
CO3	Students will understand the relevance and importance of the Different manufacturing techniques and real life application in industry.
CO4	Classify different plastic molding processes, Extrusion of Plastic and Thermoforming.
CO5	Select appropriate Joining Processes to join Work piece.

EE2217- Electrical Technology	
CO1	Analysis of Resistive Circuits and Solution of resistive circuits with independent sources
CO2	Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits
CO3	Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
CO4	To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor
CO5	To get an insight about the basic introduction of Digital electronics.

EE2281- Electrical Technology Laboratory	
CO1	Become familiar with the curricular structure of Electrical Engineering
CO2	Be exposed to the breadth of electrical engineering
CO3	Awareness of general structure of power systems
CO4	Acquire knowledge about battery technology
CO5	Acquire knowledge about the single phase and three base electrical circuits

ME2271- Geometric Modeling Laboratory - I	
CO1	Identify proper computer graphics techniques for geometric modeling.
CO2	Transform, manipulate the object and understand rapid prototyping and tooling concept in any real life application.
CO3	Acquire fundamental knowledge of CAD/CAM.
CO4	Solve numerical on transformation. CO5 Understand modeling of curves, surfaces and solids.
CO5	Generate tool path for part and to create CNC manual part program and APT part program.

ME2272- Manufacturing Processes Laboratory - I	
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CO1	Student will be able to choose machining processing to manufacture any component
CO2	Student will be able to Estimate machining time for milling and drilling process.
CO3	Student will be able to understand finishing processes
CO4	Student will be able to calculate forces during orthogo0l metal cutting.
CO5	Student will be able to explain principle and applications of advanced machining processes.

MA2204-Statistics and Numerical Methods	
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CO1	Students would get familiarize about the Fourier series to generate a sequence of waves
CO2	Students would have learnt about the Fourier Transform to a sequence of non parabolic waves to a general function.
CO3	Students will be familiar with the construction of partial differential equation and finding methods to solve it
CO4	Students would gain knowledge about the applications of PDE in Chemical Engineering
CO5	Students would have acquired knowledge on Z Transforms for a 3D model and its solution

ME2225-Thermal Engineering	
	ME2225-Thermal Engineering
CO1	Understanding the concept of I.C. engines and its various systems involved.
CO2	Evaluation of performance of I.C. engines and how to control emissions from I.C. engines.
CO3	Concept of various compressors and their performance evaluation.
CO4	Principles of various refrigerators, AC systems and their performance calculation.
CO5	Concept of nozzles and turbines and their performance evaluation.

ME2216-Automobile Engineering	
	ME2216-Automobile Engineering
CO1	Gain the Knowledge on Combustion in SI & CI Engine
CO2	Perform automotive drive train inspection, maintenance, diagnosis and repairs
CO3	Develop and implement strategies and processes to solve suspension & brake system repair problem
CO4	Understand Electrical system and séances used in automobile vehicles
CO5	Understand the fundamentals of formation of automobile pollution and various control techniques

ME2209-Kinematics of Machinery	
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CO1	Designing a suitable mechanism depending on application
CO2	Drawing displacement diagrams and cam profile diagram for followers executing different types of motions and various configurations of followers,
CO3	Drawing velocity and acceleration diagrams for different mechanisms,
CO4	Selecting gear and gear train depending on application.
CO5	Determine the degrees-of-freedom (mobility) of a mechanism.

ME2210-Strength of Materials	
CO1	Able to understand the basic of stress, strain and various loads.
CO2	Able to calculate (Or) design the beam.
CO3	Able to understand the theory of torsion of shafts.
CO4	Able to calculate the bending moment, slope and deflection by various methods.
CO5	Able to understand the principal stresses, principal strain and pressure vessels.

ME2211-CAD/CAM	
CO1	To understand the role of computers in design and manufacture.
CO2	To understand both the hardware and software of CAD/CAM system together with practical discussion of their use in engineering.
CO3	To understand the two dimensional and three dimensional transformations in computer graphics for drafting and analysis.
CO4	To understand the modeling and analysis of 3D model and learn the fundamentals of finite element methods.
CO5	To understand the integration of CAD, simulation, manufacturing, production planning and control.

ME2277-Thermal Engineering Laboratory - I	
CO1	Analyze the influence of variation in TDC and BDC operations
CO2	Calculate the IP
CO2	Calculate the BP
CO2	Calculate the BTE
CO5	Calculate and compare the performance characteristics

ME2278-Strength of Materials Laboratory	
CO1	Able to conduct tension,compression and shear test on UTM and evaluate material properties
CO2	Able to conduct torsion, hardness and impact test
CO3	Able to determine various module, hardness number and impact energy
CO4	Able to conduct tension and compression test on springs
CO5	Able to determine stiffness, shear modulus and modulus of rigidity.

ME2279-Geometric Modeling Laboratory - II	
CO1	Understand the importance of finite element analysis.
CO2	Develop good knowledge about analysis software ANSYS.
CO3	Enable the student to design and analyze any 2D and 3D models.
CO4	Perform deflection and stress analyses of planar truss structures.
CO5	Use modeling with FEA tools to input the structure, perform the analysis and visualize the results.

ME2280-Manufacturing Processes Laboratory – III	
CO1	Understand the importance of finite element analysis
CO2	Develop good knowledge about analysis software ANSYS
CO3	Enable the student to design and analyze any 2D and 3D model
CO4	Perform deflection and stress analysis of planar truss structures
CO5	Use modeling with FEA tools to input the structure, perform the analysis and visualize the result

IT1212-Cyber Security	
CO1	is an organizational asset that has utility, and a value – which may be relative depending on the perspective taken, and therefore can be classified to reflect its importance to an organization or individual
CO2	is vulnerable to threats in systems
CO3	has the attributes relating to confidentiality, possession or control, integrity, authenticity, availability, and utility, any of which can make it vulnerable to attack
CO4	may need to be protected – and some of the reasons why that protection must occur (for example, legal and regulatory drivers, customer rights or organization objectives)
CO5	that information risk management is a term referring to the process of documenting what information is at risk, type and level of risk realized; and the impact of realization

ME1216-Finite Element Analysis	
CO1	Students will understand the fundamentals of FEM.
CO2	Students will study the discretization of the problem interpolation functions and simplex elements
CO3	Students understand FEM applied to solid mechanics problems.
CO4	Students will understand the FEM for trusses, beams and frames.
CO5	Students will understand FEM for Heat transfer problems and further applications

ME1214-Mechanical Measurements and Metrology	
CO1	To understand the basic principle and application of pressure, strain and force measurement system.
CO2	To understand the basic principle and application of temperature measurement system.
CO3	To understand and study the basic methods of precision and accuracy.
CO4	To understand and study the basic methods of linear angular and gear measurement.
CO5	To understand and study the basic methods of surface finishing and interferometry system.

ME1215-Computer Aided Manufacturing	
CO1	To understand the advanced manufacturing concepts used in manufacturing companies.
CO2	To gain knowledge on the types of AGVs and the approaches to process planning.
CO3	To understand the working principle of typical CNC machine tool and selection of CNC machine tools.
CO4	To gain knowledge on part programming of machine centre, manual part programming and CAD/CAM based NC part programming methods.

CO5	To understand the robotic systems, robot anatomy, robotic mechanisms and robotic applications.

ME1217-Machine Design II	
CO1	To develop competency in designing various types of bearing,belt and chains.
CO2	To develop competency in designing various types of spur and helical gears.
CO3	To develop competency in designing various types of worm and bevel gears.
CO4	To develop competency in designing a system involving the various component, as a gear box design in practical.
CO5	To develop competency in designing a system involving the various component, as a clutch,brakes,ratchet and pawl mechanism.

FS1212-Nuclear Engineering and Safety	
CO1	Students will understand the basics of nuclear engineering.
CO2	Students will study the nuclear reactor safety operation.
CO3	Students understand reactor containment and safety features.
CO4	Students will study NRC regulations and procedures.
CO5	Students will study the reactor safety analyses.

ME1283-Mechanical Measurements Lab	
CO1	To learn the basic concepts of mechanical measurements like capabilities and limitations of measurement technologies.
CO2	To learn the collection and analysis of measurement data.
CO3	To study the evaluation of measurement methodologies.
CO4	Calculation of least count of instrument
CO5	Use a variety of equipment and techniques to measure force, flow, pressure, temperature, speed, strain, rotational position.

ME1282-Simulation Laboratory - II	
CO1	Able to Determine the nodal deflections, reaction forces, and stress for the truss system
CO2	Able to find dynamic analysis of automotive components using FEA software.
CO3	Able to Analysis of conduction problems using FEA software
CO4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
CO5	Analyze the temperature distribution in two dimensional heat transfer problems.

ME1284-Metrology Laboratory	
CO1	To understand and recognize the concepts of metrology and measuring instruments
CO2	To understand and Measure the linear measuring instruments
CO3	To analyze and interpret the use of slip gauge to build required dimension.
CO4	To understand and determine job run out on lathe and use of CMM and profile projector to check dimensions.
CO5	To determine the hardness of different materials.

ME1223-Optimization Techniques for Production Management	
CO1	Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems.
CO2	Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications.
CO3	Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
CO4	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
CO5	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.

ME12D5-Refrigeration and Air Conditioning	
CO1	Students will understand FEM for Heat transfer problems and further applications
CO2	Understand and analysis of vapour compression refrigeration cycle.
CO3	Understand and analysis of vapour Absorption cycle
CO4	Make basic calculation of Psychometric properties and process
CO5	Understand the components of HVAC system.

ME12C3-Entrepreneurship Development	
CO1	To study the types and factors affecting entrepreneurs.
CO2	To understand the major motivation influencing the entrepreneurs and EDP programs.
CO3	To study the classification of small business, project formulation and appraisal
CO4	To learn the needs and sources of financing, costing and income tax
CO5	To study the sickness and government policy of small scale industry

ME12A8-Welding Technology	
CO1	Learn and understand the working principle equipments and fabrication techniques of special welding process
CO2	Study and gain the knowledge about unconventional welding process
CO3	Learn and get practical oriented applications of welding in industries like oil and gas and heavy engineering
CO4	Understand the weldability of different materials, automation of welding process and design in welding
CO5	Study the various quality control testing of welded components

ME12P5- PROJECT WORK	
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Undertake problem identification, formulation and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach.
CO4	Conduct an engineering project
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer.