Holy-wood Academy, Kolhapur's
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Department of Mechanical Engineering

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VII) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Finite Element Analysis
Year	Final Year B.E.	**Semester**	VII
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Understand the fundamental concepts and theory of FEA		
CO2	Explain one dimensional problems using FEA theory		
CO3	Solve 2D plane stress and plane strain problems using FE approximations		
CO4	Analyze the truss for given loading condition		
CO5	Determine nodal temperature in thermal domain		
CO6	Explain types of finite element problems and steps in FEA		
	Finite element analysis Laboratory		
CO1	Develop the computer program based on finite element problems.		
CO2	Use commercial software to solve basic engineering problems in structure and thermal		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Mechanical System Design
Year	Final Year B.E.	**Semester**	VII

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Understand the aesthetic & ergonomic principals in design.
CO2	Analyze the pressure vessel as per IS2825 codes.
CO3	Study the construction, working and design of different type of brakes and clutches.
CO4	Analyze machine tool gear box design.
CO5	Design the different I.C engine components like Piston, Piston pins and Connecting rod.
CO6	Compare the different parameters by using various methods for optimum design of mechanical component

Name of Program	**Mechanical Engineering**	**Name of Course**	Mechanical System Design
Year	Final Year B.E.	**Semester**	VII

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Apply the aesthetic & ergonomic principals in product design.
CO2	Use IS Codes, Design data books for Designing and Analyzing the pressure vessel.
CO3	Design and Analyze the Gear Box.
CO4	Design various I. C. Engine Components.
CO5	Optimize design of various components or systems in mechanical engineering

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year (BE)Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	**TOTAL QUALITY MANAGEMENT**
Year	Final Year	**Semester**	VII
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Understand importance of assuring quality in the service or manufacturing sector and explain Quality assurance system		
CO2	Identify and solve the quality related problems in manufacturing or service sector at various stages by using various TQM tools and techniques,		
CO3	Calculate reliability of system		
CO4	Understand vendor rating and select suitable vendor		
CO5	Interpret various quality attributes and discuss the various quality approaches.		
CO6	Comment on quality using Taguchi Philosophy.		

Name of Program	**Mechanical Engineering**	**Name of Course**	**TOTAL QUALITY MANAGEMENT Lab**
Year	Final Year	**Semester**	VII
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Know the concept of total quality and role of quality assurance.		
CO2	Understand planning and controlling techniques for quality		
CO3	Know the reliability approach for quality		
CO4	Realize benefits of taguchi’s quality philosophy		
CO5	Understand the key issues and some popular approaches to TQM implementation		
CO6	Understand the current trends in TQM		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Automobile Engineering
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Identify** the different parts of the automobile.
CO2	**Explain** components of automobile like engine, transmission, clutch, brakes etc.,
CO3	**Distinguish** various types of automobile lay outs as per drive given to wheels.
CO4	**Solve** the problems related with various resistances for the automobile, engine power calculation.

Name of Program	**Mechanical Engineering**	**Name of Course**	Automobile Engineering Lab
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Identify** types of automobile bodies and materials used for the same.
CO2	**Demonstrate** various automobile systems like clutch, gearbox final drive, brake, steering suspension wheels and Tyres, and its construction and working.
CO3	**Demonstrate** various electrical and electronic systems like lighting, starting charging electronic controlled management system and its construction and working principle, sensors used in automobile
CO4	**Explain** modern trends, techniques used in industries.

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Refrigeration & Air Conditioning
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Demonstrate and understand the need and importance of HVAC technology, the typical and some advanced and innovative schematic designs, and the goals of HVAC engg. & HVAC systems.
CO2	Demonstrate and understand the thermal comfort conditions w.r.to temp., humidity, human clothing & activities and its impact on human comfort, productivity & health.
CO3	Demonstrate and understand the psychrometry and its application in HVAC engg. and design and will practice or observe psychrometric measurements.
CO4	Demonstrate and understand the heat transfer in buildings with a given architectural design and its application to heating and cooling load estimation especially including thermal lag effects by conducting a detailed annual load analysis for a representative building and presents the results of this analysis in a formal report possibly including recommendations for energy conservation.
CO5	Demonstrate and the understand the engg. & operation of vapor compression and possibly heat driven refrigeration systems and evaporative cooling systems and understand contemporary issues of ODP&GWP w.r.to refrigeration systems.

Name of Program	**Mechanical Engineering**	**Name of Course**	Refrigeration & Air Conditioning Lab
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Identify** the meaning of Refrigeration & Air conditioning and Methods.
CO2	**Demonstrate** various systems of Refrigeration like vapour compression and vapour absorption, its principle, construction, working & performance.
CO3	**Demonstrate** various Air conditioning systems like Unitary & central A/C systems its principle, construction, working & performance
CO4	**Explain** different controls in Refrigeration & Air conditioning systems.
CO5	**Selecting** Refrigeration & Air conditioning equipment's based on its specification & features.

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year (BE)Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	INDUSTRIAL TRAINING
Year	Final Year	**Semester**	VII
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Comprehend the knowledge gained in the course work		
CO2	Create, select, learn and apply appropriate techniques, resources, and modern engineering tools		

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year (BE)Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Project Phase - I
Year	Final Year	**Semester**	VII
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Improve the professional competency and research aptitude in relevant area.		
CO2	Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year, T.E. Mechanical (Semester V) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Heat & Mass Transfer
Year	Third Year T.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	State and describe mechanism and laws of heat transfer		
CO2	Determine the heat transfer rate in composite engineering systems		
CO3	Analyze the problem of heat transfer in extended surfaces		
CO4	Understand the mechanism and different laws of radiation heat transfer		
CO5	Evaluate the heat transfer coefficient in convective heat transfer		
CO6	Calculate the heat exchanger geometrical dimensions for given inlet conditions		
	Heat & Mass Transfer Laboratory		
CO1	Determine thermal conductivity of different materials		
CO2	Calculate thermal resistance for different systems		
CO3	Demonstrate the concept and principle of heat pipe, fins, heat exchangers and other heat transfer devices		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Third Year T.E. Mechanical (Sem V) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Manufacturing Engineering
Year	Third Year B.E.	**Semester**	V

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Know** the metal cutting technology, including the process, measurements, design & selection of various cutting tools & their industrial specifications.
CO2	**Describe** the design practices of tooling (jigs & fixtures) & die design for press work
CO3	**Explain** the process of design practices of single spindle automat
CO4	**Know** the various aspects of CNC machine technology & its tooling.

Name of Program	**Mechanical Engineering**	**Name of Course**	Manufacturing Engineering Lab
Year	Third Year B.E.	**Semester**	V

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Know** the working of Broaching machine, Grinding machine, Slotting machine
CO2	**Prepare** drawing of any one Drilling jig/ Milling fixture.
CO3	**Prepare** Tool layout, process sheet and cam design for single spindle automat.
CO4	**Know** tools used in CNC machining.
CO5	**Know** the design of jig and fixtures, sheet metal.

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year T.E. Mechanical (Sem. - V) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Control Engineering
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Know** the fundamentals of control systems and its classification and major applications.		
CO2	**Understand** the procedure of mathematical modeling of various control system components		
CO3	**Understand** the concept of system stability and application of various tools to check the system stability		
CO4	**Evaluate** the system response for various types of inputs		
CO5	**Analyze** the performance of control system.		

Name of Program	**Mechanical Engineering**	**Name of Course**	Control Engineering Lab
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Demonstrate** the working of system components like servo motors, amplifiers tachometers etc.		
CO2	**Demonstrate** the working P, PI, PD and PID controller in temperature and flow control systems.		
CO3	**Prepare** mathematical models of mechanical, electrical, fluid systems		
CO4	**Prepare** the root locus and bode diagram for given transfer function.		
CO5	**Evaluate** the control system performance analytically and using software		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year B.E. Mechanical (Semester V) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Machine Design I
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Study basis principles of machine design		
CO2	Understand the principals involved in evaluating the dimension of a component to satisfy functional and strength requirement.		
CO3	Understand and learn use of catalogues and design data book.		

Name of Program	**Mechanical Engineering**	**Name of Course**	Machine Design I Tutorial
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Study the fundamentals of design.		
CO2	Design the mechanical components at static conditions		
CO3	Using standard catalogues and design the belts and standard components		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year B.E. Mechanical (Semester V) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	THEORY OF MACHINES-II
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Indentify** the various types of gears.		
CO2	**Select** a gear drive for practical purpose.		
CO3	**Analyze** the gyroscopic effects for practical life.		
CO4	**Know** force analysis of mechanisms		
CO5	**Know** the basic principles of balancing		
CO6	**Know** the basics of Flywheel design		

Name of Program	**Mechanical Engineering**	**Name of Course**	THEORY OF MACHINES-II
Year	Third Year B.E.	**Semester**	V
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Generate** of involute gear teeth profile using rack cutter method.		
CO2	**Solve** numerical on epicyclic Gear Train and Flywheel		
CO3	**Perform** experiment on Gyroscope		
CO4	**Determine** M.I. using bifilar, trifilar suspension system and Compound pendulum method		
CO5	**Perform** experiment on Balancing of rotary masses		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year T.E. Mechanical (Sem-V) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Mini Project-I
Year	Third Year	**Semester**	V

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Work effectively in a group on specific assignment, engineering or real life problems
CO2	Identify the real life, institutional, social, engineering, local industrial problems relevant to the societal and environmental issues
CO3	Think creatively to come out with feasible solution for engineering or real life problems
CO4	Design / Development of system, components or processes that meet the specified needs by using advance tools/ techniques/ resources
CO5	Communicate effectively on project activities, write effective reports, design documentation and make effective presentations

Department of Mechanical Engineering

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Second Year Mechanical (Semester III) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Fluid Mechanics
Year	**Second Year**	**Semester**	III
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Define and calculate various properties of fluid.		
CO2	Explain various types of flow and Calculate Velocity and acceleration of fluid particles.		
CO3	Apply Bernoulli's equation to simple problems in fluid mechanics.		
CO4	Explain laminar and turbulent flows on flat plates and through pipes		
CO5	Understand boundary layer .Explain and use dimensional analysis to simple problems in fluid mechanics		
CO6	Understand drag and lift. Apply fundamentals of compressible fluid flows to relevant systems		

Name of Program	**Mechanical Engineering**	**Name of Course**	Fluid Mechanics Lab
Year	Second Year	**Semester**	III
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Study of pressure measuring devices and Use manometers for pressure measurement.		
CO2	Observe different flow patterns over different shape objects.		
CO3	Understand laminar and Turbulent flow and determine Critical Reynolds number using Reynolds Apparatus.		
CO4	Verify Bernoulli's theorem.		
CO5	Do Calibration of flow measuring devices like Venturimeter, Orifice meter, V-notch.		
CO6	Determination of Major & Minor Losses in fluid flow.		
CO7	Study of wind Tunnel.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Second Year S.E. Mechanical (Sem III) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	APPLIED THERMODYNAMICS
Year	Second Year B.E.	**Semester**	III

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Understand basic concepts of physics and chemistry behind thermodynamics
CO2	Solve introductory problems on Rankine cycle.
CO3	Understand functioning of steam generators and condensers.
CO4	Design the steam nozzle.
CO5	Understand basic concepts of Impulse turbine.
CO6	Understand basic concepts of Reaction turbine, Governing and trouble shooting of turbine.

Name of Program	**Mechanical Engineering**	**Name of Course**	APPLIED THERMODYNAMICS Lab
Year	Second Year B.E.	**Semester**	III

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Understand different types of boilers, boiler mountings, Accessories.
CO2	Understand condenser and study of cooling towers.
CO3	Understand different lubrication properties.

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Second Year S.Y. Mechanical (Sem III) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Metallurgy
Year	Second Year B.E.	**Semester**	III

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Analyze** the structure of materials at different levels
CO2	**Understand** concept of mechanical behavior of materials and calculations of same using appropriate equations and the strengthening mechanisms and suggest appropriate NDT technique
CO3	**Explain** the concept of phase and phase diagram and understand the basic terminologies associated with metallurgy
CO4	**Understand and suggest** the heat treatment process and types
CO5	**Prepare** samples of different materials for metallography
CO6	**Understand** the concept of powder metallurgy.

Name of Program	**Mechanical Engineering**	**Name of Course**	Metallurgy Lab
Year	Second Year B.E.	**Semester**	III

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Measure** hardness of given material using Brinell and Rockwell tests
CO2	**Evaluate** stretchability of given sheet metal samples of different thicknesses
CO3	**Demonstrate** the application of various non-destructive tests
CO4	**Prepare** specimen for observing the microstructure of the material
CO5	**Sort** out plain carbon steel samples based on their carbon percentages

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Second Year S.Y. Mechanical (Sem III) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Machine Drawing
Year	Second Year B.E.	**Semester**	III

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Understand & draw various BIS conventions.
CO2	Specify and draw Limits, Fits & Tolerances in drawing.
CO3	Draw details from assembly and vice versa
CO4	Draw interpenetrated vies of solids.

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Department of Mechanical Engineering

Name of Program:Mechanical Engineering Program Code: 631561210

Class:Final Year (BE)Mechanical (Semester VIII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Energy & Power Engineering
Year	Final Year	**Semester**	VIII

Course Outcomes

Sr.No.	**Upon successful completion of this course, the student will be able to:**
CO1	Acquire the knowledge of renewable sources of energy and utilization
CO2	Enable the student to estimate the potential of energy sources
CO3	Study various power stations , Performance and economic analysis
CO4	Understand the new trends in power and energy sectors

Name of Program: Mechanical Engineering Program Code: 631561210

Class: Final Year B.E. Mechanical (Semester VIII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Mechatronics
Year	Final Year B.E.	**Semester**	VIII

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Understand** the introduction of mechatronics: Study the type of sensors and transducers and their applications.
CO2	**Understand** the need of signal conditioning, study the various parts used for signal conditioning, modes of data transfer and signal conditioning .

CO3	**Understand** the logic functions and their applications, study of comparison between microprocessor and microcontroller and their applications.
CO4	**Understand** the working of PLC and components used: Study the fundamentals of ladder programming and symbols used.
CO5	**Building** a ladder programs for problem related to industrial applications.
CO6	**Case studies** of mechatronics system designs, like piece counting system, pick and place manipulator and part loading and unloading etc.

Name of Program	**Mechanical Engineering**	**Name of Course**	Mechatronics Lab
Year	Final Year B.E.	**Semester**	VIII
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Trial** on sensors		
CO2	**Writing** and Executing the PLC programs based on industrial applications using Timers, Counters, Internal Relays.		
CO3	**Building** and fabricating the simple mechatronics working project.		
CO4	**Study** and writing assignments on Microprocessor and Microcontroller.		
CO5	**Study** and writing assignments on PLC data handling ,fault findings, SCADA and MEMS		
CO6	**Visit** to industry to study mechatronics system application and preparing a report.		

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year B.E. Mechanical (Semester VIII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	**Noise and Vibration**
Year	Final Year B.E.	**Semester**	VIII

Course Outcomes	
Sr.No.	**Upon successful completion of this course, the student will be able to:**
CO1	Develop Mechanical Model to represent dynamic system
CO2	Estimate natural frequency of mechanical element / system
CO3	Analyze vibratory response of mechanical element / system
CO4	Carryout measurement of various vibration parameters
CO5	Understand relevance of noise in Mechanical System

Name of Program	**Mechanical Engineering**	**Name of Course**	**Noise and Vibration LAB**
Year	Final Year B.E.	**Semester**	VIII

Course Outcomes	
Sr.No.	**Upon successful completion of this course, the student will be able to:**
CO1	Estimate natural frequency of mechanical spring, mass system at free vibrations
CO2	Estimate natural frequency of mechanical spring, mass system at forced vibrations
CO3	Measurement of vibrations using FFT Analyzer
CO4	Measurement of Noise using FFT Analyzer

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Engineering
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Analyze and design new method of performing job.
CO2	Measure and estimate standard time for job.
CO3	Understand different types of plant layouts.
CO4	Interpret job evaluation and merit rating.

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Engineering Lab
Year	Final Year B.E.	**Semester**	VII

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	Understand the concept of productivity and solve the problems on productivity.
CO2	Solve Two case studies on method study with the help of Man; Machine chart and Two handed process chart
CO3	Demonstrate Stop watch time study for an operation
CO4	Explain Plant site location analysis and Plant layout problems.
CO5	Solve Case study on Value analysis and Case study on job evaluation and merit rating

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Final Year B.E. Mechanical (Semester VIII) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Industrial Automation & Robotics(Elective: IV)
Year	Final Year B.E.	**Semester**	VIII
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Understand need and elements of automation with its advanced functions		
CO2	Describe industrial control systems and transfer line configurations, mechanisms, applications		
CO3	Explain automated assembly configurations and vibratory devices		
CO4	Understand fundamentals of industrial robots with its elements and properties		
CO5	Describe industrial robots end effectors and different sensors		
CO6	Explain industrial robot teaching methods and programming methods		

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year (BE)Mechanical (Semester VIII) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Project Phase - II
Year	Final Year	**Semester**	VIII
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Improve the professional competency and research aptitude in relevant area.		
CO2	Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.		

Name of Program:Mechanical Engineering **Program Code: 631561210**

Class:Final Year B.E. Mechanical (SemesterVI) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Management and Operation Research
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Explain** various functions of management.		
CO2	**Illustrate** the need to optimally utilize the resources in various types of industries.		
CO3	**Aware** about the norms of industrial safety, business ethics, MIS, Industrial Safety and procedure to start small scale industries.		
CO4	**Apply** the various models of operation research such as assignment model, transportation model, Linear programming model, Decision Theory Model, Network Model and Sequencing Model.		

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Management and Operation Research Tutorial
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Know** various functional areas of management.		
CO2	**Formulate** and solve engineering and managerial situations as LPP.		
CO3	**Formulate** and solve engineering and managerial situations as Transportation and Assignment problems.		
CO4	**Formulate** and solve engineering and managerial situations as Decision theory, Network model and Sequencing models.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class:Third Year T.E. Mechanical (SemesterVI) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Fluid Power
Year	Third Year	**Semester**	VI

Course Outcomes

Sr.No.	**Upon successful completion of this course, the student will be able to:**
CO1	Explain and draw different ISO/JIC symbols used in hydraulic and pneumatic circuits.
CO2	Demonstrate hydraulic and pneumatic system components.
CO3	Interpret the hydraulic and pneumatic circuits with their application.
CO4	Explain safety regulations and troubleshooting in hydraulic and pneumatic system.
CO5	Explain fluidics and their application.

Name of Program	**Mechanical Engineering**	**Name of Course**	Industrial Fluid Power Lab
Year	Third Year	**Semester**	VI

Course Outcomes

Sr.No.	**Upon successful completion of this course, the student will be able to:**
CO1	Classify and understand various hydraulic and pneumatic ISO/JIC symbols.
CO2	Discuss hydraulic and pneumatic system components.
CO3	Illustrate hydraulic and pneumatic circuits with its application.
CO4	Discuss maintenance and safety regulation in hydraulics and pneumatics.

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year T.E. **Mechanical (Semester VII) (SUK)**

Name of Program	**Mechanical Engineering**	**Name of Course**	Metrology and Quality Control
Year	Third year	**Semester**	VIII
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Identify and use various measuring instruments and select appropriate instrument for particular feature measurement.		
CO2	Distinguish and understand quality assurance and quality control.		
CO3	Prepare and understand drawings with general dimensions, tolerances and surface finish.		

Name of Program	**Mechanical Engineering**	**Name of Course**	Metrology and Quality Control
Year	Third year	**Semester**	VIII
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Identify and use various measuring instruments and select appropriate instrument for particular feature measurement.		
CO2	Use control charts and sampling plans to manufacturing and service sector problems.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year Mechanical **(Semester VI) (SUK)**

Name of Program	**Mechanical Engineering**	**Name of Course**	**Machine Design II**
Year	**Third Year**	**Semester**	**VI**
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Design machine elements subjected to fluctuating loading.		
CO2	Study the significance of interaction of manufacturing, assembly, and material election on product and process design.		
CO3	Understand effect of tribological considerations on design.		
CO4	Study and select rolling contact bearings and Select the bearing for the particular application from the manufacturer's catalogue.		
CO5	Design sliding contact bearings used in various mechanical systems.		
CO6	Design various types of gears such as spur, helical, bevel and worm gear.		

Name of Program	**Mechanical Engineering**	**Name of Course**	**Machine Design II**
Year	**Third Year**	**Semester**	**VI**
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Study of Ball bearing mountings and its selection preloading of bearings.		
CO2	Design and analyze the Spur / Helical gear box.		
CO3	Design and analyze the Bevel / Warm gear box.		
CO4	Understand the various components and there working in industry by visit.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year T.E. Mechanical (Semester VI) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Internal Combustion Engines
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Understand basic principle of operation of I.C. engines		
CO2	Differentiate between S.I , C.I. and Two stroke, Four stroke engines		
CO3	Demonstrate the different components of injection and ignition systems		
CO4	Explain alternative fuels used in I.C. engines		
CO5	Analyze the different performance parameters of I.C. Engines		
CO6	Calculate the air-fuel ratio for I.C. Engines		
Internal Combustion Engines Laboratory			
CO1	Understand the basic components of different fuel systems of I.C. Engines		
CO2	Calculate different efficiencies of I.C. Engines		
CO3	Evaluate the performance characteristics of I.C. Engines		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Third Year T.E. Mechanical (Sem VI) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	COMPUTER INTEGRATED MANUFACTURING Lab
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Locate modern techniques for integrating CAD/CIM in CIM		
CO2	Obtain an overview of computer technology in Production Planning and Control including Computers, Data base and data collection, Networks, Machine Control.		
CO3	Apply classification and coding in Group Technology.		
CO4	Elaborate Computer Aided Production Planning and Control.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Third Year T.E. Mechanical (Sem V) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	**Workshop Practice -VI**
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Know** the metal cutting technology, including the process, measurements, design & selection of various cutting tools & their industrial specifications.		
CO2	**Describe** the design practices of tooling (jigs & fixtures) & die design for press work		
CO3	**Explain** the process of design practices of single spindle automat		
CO4	**Know** the various aspects of CNC machine technology & its tooling.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Third Year T.E. Mechanical (Sem-VI) (SUK)

Name of Program	Mechanical Engineering	**Name of Course**	Mini Project-II
Year	Third Year	**Semester**	VI
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Work effectively in a group on specific assignment, engineering or real life problems		
CO2	Identify the real life, institutional, social, engineering, local industrial problems relevant to the societal and environmental issues		
CO3	Think creatively to come out with feasible solution for engineering or real life problems		
CO4	Design / Development of system, components or processes that meet the specified needs by using advance tools/ techniques/ resources		
CO5	Communicate effectively on project activities, write effective reports, design documentation and make effective presentations		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: S.E. Mechanical (SemesterIV) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Analysis of Mechanical Elements
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Demonstrate fundamental knowledge about various types of loading and stresses induced.		
CO2	Draw SFD and BMD for different types of loads and support conditions		
CO3	Compute and analyze stresses induced in mechanical components.		
CO4	Analyze buckling and bending phenomenon in columns and beams.		

Name of Program	**Mechanical Engineering**	**Name of Course**	**Analysis of Mechanical Elements Lab**
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr.No.	**Upon successful completion of this course, the student will be able to:**		
CO1	To gain knowledge of different types of stresses, Strains and deformation induced in Mechanical Components due to external loads.		
CO2	To study the distribution of various stresses in Mechanical Elements.		
CO3	. To study the effect of component dimensions and shape on stresses and deformations.		
CO4	Draw SFD and BMD for different types of loads and support conditions		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Second Year B.E. Mechanical (Semester IV) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Fluid & Turbomachinery
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	Understand working principle of Impulse and Reaction turbine		
CO2	Understand the concept of Centrifugal pumps and various efficiencies related to it.		
CO3	Understand the concept of reciprocating air compressors.		
CO4	Understand the concept of centrifugal and Axial compressors.		
CO5	Understand working of Gas Turbines and know its various configurations.		

Name of Program	**Mechanical Engineering**	**Name of Course**	Fluid & Turbomachinery Lab
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Identify** the meaning of Hydraulic Devices and their applications.		
CO2	**Demonstrate** various types of Turbines- its principle, construction, working & performance.		
CO3	**Demonstrate** various types of Compressors and Pumps- its principle, construction, working & performance		
CO4	**Explain** different Applications of Turbines, Pumps & Compressors.		
CO5	**Selecting** Turbines, Pumps & Compressors based on their specification & features for different applications.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class: Second Year B.E. Mechanical (Semester IV) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	THEORY OF MACHINES-I
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Know** different types of mechanisms and their applications.		
CO2	**Analyze** kinematic theories of mechanism.		
CO3	**Know** different theories of friction and their applications.		
CO4	**Design** cam with follower for different applications.		
CO5	**Select** different power transmitting elements according to application.		
CO6	**Select** different governing mechanisms according to application.		

Name of Program	**Mechanical Engineering**	**Name of Course**	THEORY OF MACHINES-I
Year	Second Year	**Semester**	IV
Course Outcomes			
Sr. No.	**Upon successful completion of this course, the student will be able to:**		
CO1	**Know** basic terminology of kinematics of mechanisms.		
CO2	**Solve** Velocity and Acceleration problems by different methods graphically.		
CO3	**Solve** problems on cam profile graphically.		
CO4	**Perform** Experiment on Governor characteristics.		

Name of Program: Mechanical Engineering **Program Code: 631561210**

Class : Second Year S.E. Mechanical (Sem IV)

Name of Program	**Mechanical Engineering**	**Name of Course**	Machine Tools & Processes
Year	Second Year S.E.	**Semester**	III

Course Outcomes	
Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Identify** Casting Processes, working principles and applications and list various defects in metal casting.
CO2	**Understand** the various metal forming processes, working principles and applications.
CO3	**Study** center lathe and its operation including plain, taper turning, work holding devices and cutting tool.
CO4	**Study** shaping, planning and drilling, their types and related toolings.
CO5	**Classify** the Non-traditional machining and understanding working principle and applications.

Name of Program: Mechanical Engineering **Program Code: 631561210**

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Class : Second Year S.E. Mechanical (Sem IV) (SUK)

Name of Program	**Mechanical Engineering**	**Name of Course**	Testing and Measurement Lab
Year	Second Year S.E.	**Semester**	IV

Course Outcomes

Sr. No.	**Upon successful completion of this course, the student will be able to:**
CO1	**Understanding** working principle and application of measuring instrument
CO2	**Calibration of** temperature measuring instruments
CO3	**Study of** pressure measuring instruments.
CO4	**Demonstration** of flow rate measuring instrument
CO5	**Classify** the basic vibration measuring instruments and understanding working principle and applications.