



**Hindustan College of Science and Technology
Farah-Mathura
(AICTE approved & affiliated to AKTU)**

**NAAC
CRITERIA-2**

Metric No.- 2.6.1 (Q_iM)

**Programme Outcomes (POs) and Course
Outcomes (COs) for Mechanical
Engineering
(2021-25)**

Mechanical Engineering
B. TECH II YEAR
CURRICULUM STRUCTURE

SEMESTER-III													
Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme			End Semester			Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031-38/KAS302	Engg. Science Course/ Maths IV	3	1	0	30	20	50		100		150	4
2	KAS301/ KVE301	Technical Communication/ Universal Human Values	2	1	0	30	20	50		100		150	3
			3	0	0								
3	KME301	Thermodynamics	3	1	0	30	20	50		100		150	4
4	KME302	Fluid Mechanics & Fluid Machines	3	1	0	30	20	50		100		150	4
5	KME303	Materials Engineering	3	0	0	30	20	50		100		150	3
6	KME351	Fluid Mechanics Lab	0	0	2				25		25	50	1
7	KME352	Material Testing Lab	0	0	2				25		25	50	1
8	KME353	Computer Aided Machine Drawing-I Lab	0	0	2				25		25	50	1
9	KME354	Mini Project or Internship Assessment*	0	0	2			50				50	1
10	KNC301/ KNC302	Computer System Security/ Python Programming	2	0	0	15	10	25		50			0
11		MOOCs(Essential for Hons. Degree)											
		Total										950	22

*The Mini Project or internship (3-4weeks)conducted during summer break after II semester and will be assessed during III semester.

Sr. No	Subject Code	Subject Name
1	KOE 033	Energy Sciences & Engineering
2	KAS301	Technical Communication
3	KME301	Thermodynamics
4	KME302	Fluid Mechanics & Fluid Machines
5	KME303	Materials Engineering
6	KME351	Fluid Mechanics Lab
7	KME352	Material Testing Lab
8	KME353	Computer Aided Machine Drawing-I Lab


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SEMESTER-IV

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS402/ KOE041-48	Maths-IV/Engg. Science Course	3	1	0	30	20	50		100		150	4
2	KVE401/ KAS401	Universal Human Values/ Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3	KME401	Applied Thermodynamics	3	0	0	30	20	50		100		150	3
4	KME402	Engineering Mechanics	3	1	0	30	20	50		100		150	4
5	KME403	Manufacturing Processes	3	1	0	30	20	50		100		150	4
6	KME451	Applied Thermodynamics Lab	0	0	2				25		25	50	1
7	KME452	Manufacturing Processes Lab	0	0	2				25		25	50	1
8	KME453	Computer Aided Machine Drawing-II Lab	0	0	2				25		25	50	1
9	KNC402/ KNC401	Python Programming/ Computer System Security	2	0	0	15	10	25		50			0
10		MOOCs(Essential for Hons. Degree)											
		Total										900	21

Sr. No	Subject Code	Subject Name
1	KAS403/	Math IV/
2	KVE401	Universal Human Value and Professional Ethics
3	KME401	Applied Thermodynamics
4	KME402	Engineering Mechanics
5	KME403	Manufacturing Processes
6	KME451	Applied Thermodynamics Lab
7	KME452	Manufacturing Processes Lab
8	KME453	Computer Aided Machine Drawing-II Lab
9	KNC402	Python Programming/



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**MECHANICAL ENGINEERING
B. TECH III YEAR
CURRICULUM STRUCTURE**

SEMESTER V													
Sl. No.	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KME 501	Heat and Mass Transfer	3	1	0	30	20	50		100		150	4
2	KME 502	Strength of Material	3	1	0	30	20	50		100		150	4
3	KME 503	Industrial Engineering	3	1	0	30	20	50		100		150	4
4		Departmental Elective - I	3	0	0	30	20	50		100		150	3
5		Departmental Elective - II	3	0	0	30	20	50		100		150	3
6	KME 551	Heat Transfer LAB	0	0	2				25		25	50	1
7	KME 552	Python Lab	0	0	2				25		25	50	1
8	KME 553	Internet of Things Lab	0	0	2				25		25	50	1
9	KME 554	Mini Project or Internship Assessment*	0	0	2				50		50	50	1
10	NC*	Constitution of India/Essence of Indian Traditional Knowledge	2	0	0	15	10	25		50			
11	MOOCs(Essential for Hons .Degree)												
		Total	17	3	6							950	22

*The Mini Project or internship (-15weeks) conducted during summer break after IV semester and will be assessed during V semester.

Sr. No	Subject Code	Subject Name
1	KME 501	Heat and Mass Transfer
2	KME 502	Strength of Material
3	KME 503	Industrial Engineering
4	KME 051	Computer Integrated Manufacturing
5	KME 055	Advance welding
6	KME 551	Heat Transfer LAB
7	KME 552	Python Lab
8	KME 553	Internet of Things Lab
9	KME 554	Mini Project or Internship Assessment*


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SEMESTER VI													
Sl. No.	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KME 601	Refrigeration and Air Conditioning	3	1	0	30	20	50		100		150	4
2	KME 602	Machine Design	3	1	0	30	20	50		100		150	4
3	KME 603	Theory of Machine	3	1	0	30	20	50		100		150	4
4		Departmental Elective- III	3	0	0	30	20	50		100		150	3
5		Open Elective - I	3	0	0	30	20	50		100		150	3
6	KME 651	Refrigeration and Air Conditioning Lab	0	0	2				25		25	50	1
7	KME 652	Machine Design Lab	0	0	2				25		25	50	1
8	KME 653	Theory Of Machine Lab	0	0	2				25		25	50	1
9	NC ⁺	Essence of Indian Traditional Knowledge/ Constitution of India	2	0	0	15	10	25		50			
10	MOOC's (Essential for Hons. Degree)		17	3	6								
Total												900	21

It is suggested that the students should choose Departmental Electives Specialization wise that will support them to gain enough learning of the chosen

Sr. No	Subject Code	Subject Name
1	KME 601	Refrigeration and Air Conditioning
2	KME 602	Machine Design
3	KME 603	Theory of Machine
4	KME 061	Non destructive
5	KOE 060	IDEA TO BUSINESS MODEL
6	KME 651	Refrigeration and Air Conditioning Lab
7	KME 652	Machine Design Lab
8	KME 653	Theory Of Machine Lab
9	NC ⁺	Essence of Indian Traditional Knowledge/ Constitution of India
10	KME 601	Refrigeration and Air Conditioning


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**MECHANICAL ENGINEERING
B. TECH IV YEAR
CURRICULUM STRUCTURE**

SEMESTER-VII														
Sl. No.	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit	
			L	T	P	CT	TA	Total	PS	TE	PE			
1		HSMC-1/HSMC-2	3	0	0	30	20	50			100		150	3
2		Departmental Elective-IV	3	0	0	30	20	50			100		150	3
3		Departmental Elective-V	3	0	0	30	20	50			100		150	3
4		Open Elective-II	3	0	0	30	20	50			100		150	3
5	KME751	Measurement Metrology Lab	0	0	2				25			25	50	1
6	KME752	Mini Projector Internship Assessment*	0	0	2				50				50	1
7	KME753	Project	0	0	8				150				150	4
8		MOOCs(Essential for Hons. Degree)												
		Total	9	0	12	21							850	18


*The Mini Projector Internship(5-6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.

S.No.	Subject code	Name of Subject
1	KHU701	RURAL DEVELOPMENT
2	KME 071	ADDITIVE MANUFACTURING
3	KME 073	MATHEMATICAL MODELING OF MANUFACTURING PROCESS
4	KOE 074	RENEWABLE ENERGY RESOURCES
5	KME751	Measurement & Metrology LAB
6	KME752	MINI PROJECT OR INTERSHIP ASSESSMENT
7	KME753	Project


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EMESTER-VIII													
Sl.No	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1		HSMC-2/HSMC-1	3	0	0	30	20	50		100		150	3
2		Open Elective-III	3	0	0	30	20	50		100		150	3
3		Open Elective-IV	3	0	0	30	20	50		100		150	3
4	KME:851	Project	0	0	18					100	300	400	9
5		MOOC's(Essential for Hons. Degree)											
		Total	9	0	18	27						850	18

Sr. No	Subject Code	Subject Name
1	KOE-090	Electric Vehicles
2	KOE-085	Quality Management
3	KHU 802	PROJECT MANAGEMENT & ENTREPRENEURSHIP
4	KME 851	PROJECT


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Program Outcomes (POs)

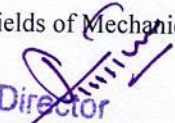
Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

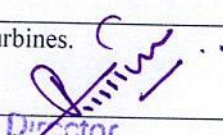
Program Specific Outcome (PSOs)

1 Exhibit their knowledge for problem identification and their respective solutions in the field of Design, Manufacturing, and Thermal Engineering.


2 Innovate, develop and apply scientific concepts, practical skills and advance tools in various fields of Mechanical Engineering.


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Course Name	Code	Course Outcomes	
Technical Communication	KAS301	CO1	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO2	Students will be able to DEVELOP an understanding of key concepts of writing, designing and speaking. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO3	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO4	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence
		CO5	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
THERMODYNAMICS	KME301	CO1	After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions.
		CO2	Students can evaluate changes in thermodynamic properties of substances.
		CO3	The students will be able to evaluate the performance of energy conversion devices.
		CO4	The students will be able to differentiate between high grade and low-grade energies.
FLUID MECHANICS AND FLUID MACHINES	KME302	CO1	To learn about the application of mass and momentum conservation laws for fluid flows.
		CO2	To understand the importance of dimensional analysis
		CO3	To obtain the velocity and pressure variations in various types of simple flows.
		CO4	To analyze the flow in water pumps and turbines.


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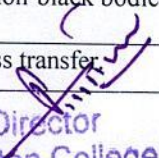
MATERIALS ENGINEERING	KME303	CO1	Students will be able to identify the crystal structure and measure the mechanical properties of materials
		CO2	Students will be able to test the various failures of materials.
		CO3	Students will be able to identify the mechanical properties based on composition of micro-constituents depicted in the phase-diagram.
		CO4	Students will understand the concept of improving the mechanical properties through heat treatment.
		CO5	Students will learn the structure and properties of alloys and composites.
FLUID MECHANICS LAB	KME351	CO1	Understand the principles and performance characteristics of flow and thermal devices
		CO2	Know about the measurement of the fluid properties
		CO3	Understand and analyze various properties of fluids.
		CO4	Evaluate the performance characteristics of fluid/thermal machinery
		CO5	Evaluate the velocity and pressure variations in various types of simple flows
MATERIALS TESTING LAB	KME352	CO1	Students will be able to perform different destructive and non-destructive testing methods to measure various mechanical properties
		CO2	Students will be able to analyse the effect of different heat-treatment processes on the Hardness.
		CO3	Students will be able to simulate the material using simulating software / measure the mechanical properties of 3-D printed components..
		CO4	Propose a plan for creating a solution for the research plan identified.
COMPUTER AIDED MACHINE DRAWING-I LAB	KME353	CO1	Understand and apply 2D software to develop a part model
		CO2	Understand about temporary and permanent fasteners
		CO3	Understand the need for free hand sketching, Free hand sketching of foundation bolts etc.
		CO4	Create assembly drawing of simple machine elements like rigid or flexible coupling
		CO5	Create 2D drawings and assemblies of various machine components


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Maths-IV	KAS401	CO1	The idea of partial differential equation and its different types of solution.
		CO2	The concept of method of separation of variables and Fourier transform to solve Partial differential equations.
		CO3	The basic ideas of statistics including measures of central tendency, correlation, Regression and their properties.
		CO4	Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
		CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
Universal Human Values	KVE401	CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society
		CO2	Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.
		CO3	Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
		CO4	Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
		CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
APPLIED HERMODYNAMICS	KME401	CO1	To learn about Air Standard Cycle
		CO2	To learn about of I law for reacting systems and heating value of fuels.
		CO3	To learn about gas and vapor cycles
		CO4	To learn about gas dynamics of air flow and steam through nozzles.
		CO5	To analyze the performance of steam turbines

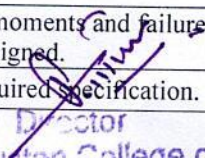
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ENGINEERING MECHANICS	KME402	CO1	Understand the force systems and application of force equilibrium to various two-dimensional problems.
		CO2	Understand the concept of stress and strain under different loading conditions.
		CO3	Determine the principal stresses and strains in structural members
		CO4	Understand and determine the stresses, slope, and deflection of the transversely loaded members
		CO5	Apply the concepts of stresses and strain in solving problems related to springs, buckling of columns and thin and thick cylinders.
MANUFACTURING PROCESSES	KME403	CO1	Students will learn the various conventional manufacturing processes / casting and forming processes.
		CO2	Students will understand the concepts of metal cutting and CNC machining.
		CO3	Students will comprehend the knowledge of grinding and super finishing processes.
		CO4	Students will understand the concepts of metal joining processes.
		CO5	Students will learn the concepts of unconventional machining processes.
APPLIED THERMODYNAMICS LAB	KME451	CO1	To understand the principles of various boilers.
		CO2	To understand the basic principles IC engines and determination of various performance parameters of IC Engines.
		CO3	To understand the principles of steam engine and Steam & Gas Turbine:
COMPUTER AIDED MACHINE DRAWING-II LAB	KME453	CO1	Understand and apply 3D software to develop a part model
		CO2	Understand conventional representation of machine components, and welded joints
		CO3	Understand and apply the basis of fit or limit system
		CO4	Understand about Plummer Block Bearing, Machine Vice, Screw Jack, Engine Stuffing box.
		CO5	Create 3D part models and assemblies of various machine components
Heat and Mass Transfer	KME501	CO1	Understand the fundamental s of heat and mass transfer.
		CO2	Apply the concept of steady and transient heat conduction.
		CO3	Apply the concept of thermal behavior of fins.
		CO4	Apply the concept of forced and free convection.
		CO5	Apply the concept of radiation for black and non-black bodies.
		CO1	Understand the fundamental s of heat and mass transfer.

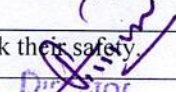

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Strength of Material	KME502	CO1	Understand the concept of stress and strain under different conditions of loading
		CO2	Determine the principal stresses and strains in structural members
		CO3	Determine the stresses and strains in the members subjected to axial, bending and tensional loads.
		CO4	Apply the concepts of stresses and strain in solving problems related to springs, column and pressure vessels
		CO5	Calculate the slope, deflection and buckling of loaded members
		CO6	Analyze the stresses developed in straight and curved beams of different cross sections
Industrial Engineering	KME 503	CO1	Understand the concept of production system, productivity, facility and process planning in various industries
		CO2	Apply the various forecasting and project management techniques
		CO3	Apply the concept of break-even analysis, inventory control and resource utilization using queuing theory
		CO4	Apply principles of work study and ergonomics for design of work systems
		CO5	Formulate mathematical models for optimal solution of industrial problems using linear programming approach.
Computer Integrated Manufacturing	KME 051	CO1	Understand the basic concepts of automation, computer numeric control machining
		CO2	Understand the algorithms of line generation, circle generation, transformation, curve, surface modeling and solid modeling
		CO3	Understand group technology, computer aided process planning, flexible manufacturing, Industry 4.0, robotics
		CO4	Understand information system and material handling in CIM environment, rapid prototyping
		CO5	Product development using the advanced manufacturing processes Apply the algorithms of line & circle generation and geometric transformations
		CO6	Develop CNC program for simple operations
Advance welding	KME 055	CO1	Understand the basic concepts of Understand the physics of arc welding process and various operating characteristics of welding power source.
		CO2	Analyse various welding processes and their applications.
		CO3	Apply the knowledge of welding for repair & maintenance, along with the weld ability of different materials.
		CO4	Apply the concept of quality control and testing of elements in industrial Environment.
		CO5	Evaluate heat flow in welding and physical metallurgy of elements.


Heat Transfer Lab	KME 551	CO1	Apply the concept of conductive heat transfer.
		CO2	Apply empirical correlations for both forced and free convection to determine the value of convection heat transfer coefficient
		CO3	Apply the concept of radiation heat transfer for black and grey body.
		CO4	Analyze the thermal behavior of parallel or counter flow heat exchanger
		CO5	Conduct thermal analysis of a heat pipe
Python Lab	KME 552	CO1	Apply conditional statement, loops condition and functions in python program
		CO2	Solve mathematical and mechanical problems using python program
		CO3	Plot various type of chart using python program
		CO4	Analyze the mechanical problem using python program
Internet of Things Lab	KME 553	CO1	Understand Internet of Things and its hardware and software components
		CO2	Interface I/O devices, sensors & communication modules..
		CO3	Remotely monitor data and control devices
		CO4	Design prototype of IoT based smart system
		CO5	Develop IoT based projects for real life problem.
Refrigeration & Air Conditioning	BME 601	CO1	Understand the basics concepts of Refrigeration & Air-Conditioning and its future prospects.
		CO2	Explain the construction and working of various components in Refrigeration & Air-Conditioning systems.
		CO3	Understand the different types of RAC systems with their respective applications.
		CO4	Apply the basic laws to the thermodynamic analysis of different processes involved in Refrigeration and Air-Conditioning
		CO5	Apply the basic concepts to calculate the COP and other performance parameters for different RAC systems
Machine Design	KME 602	CO1	Recall the basic concepts of Solid Mechanics to understand the subject.
		CO2	Classify various machine elements based on their functions and applications.
		CO3	Apply the principles of solid mechanics to machine elements subjected to static and fluctuating loads.
		CO4	Analyze forces, bending moments, twisting moments and failure causes in various machine elements to be designed.
		CO5	Design the machine elements to meet the required specification.


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Theory of Machine	KME 603	CO1	Understand the principles of kinematics and dynamics of machines.
		CO2	Calculate the velocity and acceleration for 4-bar and slider crank mechanism.
		CO3	Develop cam profile for followers executing various types of motions
		CO4	Apply the concept of gear, gear train and flywheel for power transmission
		CO5	Apply dynamic force analysis for slider crank mechanism and balance rotating & Reciprocating masses in machines.
		CO6	Apply the concepts of gyroscope, governors in fluctuation of load and brake & dynamometer in power transmission
Non destructive Testing	KME 061	CO1	Understand the concept of destructive and Non-destructive testing methods.
		CO2	Explain the working principle and application of die penetrate test and magnetic particle inspection.
		CO3	Understand the working principle of eddy current inspection.
		CO4	Apply radiographic techniques for testing.
		CO5	.Apply the principle of Ultrasonic testing and applications in medical and engineering areas.
IDEA TO BUSINESS MODEL	KOE060	CO1	Enhance creative knowledge of students regarding selection of a business idea and it's implementation process.
		CO2	Acquire knowledge on entrepreneurship development, its Pro's and con's.
		CO3	Acquire basic knowledge on how to become an Entrepreneur.
		CO4	Develop knowledge on Production systems and it's sustainability through production, planning and control (PPC)
		CO5	Develop appropriate business model and apply in a better way.
Refrigeration & Air Conditioning Lab	KME 651	CO1	Determine the performance of different refrigeration and air-conditioning systems.
		CO2	Apply the concept of psychrometry on different air cooling systems.
		CO3	Interpret the use of different components, control systems and tools used in RAC systems.
		CO4	Demonstrate the working of practical applications of RAC systems.
Machine Design Lab	KME 652	CO1	Apply the principles of solid mechanics to design various machine Elements subjected to static and fluctuating loads.
		CO2	Write computer programs and validate it for the design of different machine elements
		CO3	Evaluate designed machine elements to check their safety.


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Theory of Machine Lab	KME 653	CO1	Demonstrate various mechanisms, their inversions and brake and clutches in automobiles
		CO2	Apply cam-follower mechanism to get desired motion of follower.
		CO3	Apply the concepts of gears and gear train to get desired velocity ratio for power transmission.
		CO4	Apply the concept of governors to control the fuel supply in engine.
		CO5	Determine the balancing load in static and dynamic balancing problem
Rural development: administration and planning	KHU-701	CO1	Students can understand the definitions, concepts and components of Rural Development
		CO2	Students will know the importance, structure, significance, resources of Indian rural economy.
		CO3	Students will have a clear idea about the area development programs and its impact
		CO4	Students will be able to acquire knowledge about rural entrepreneurship.
		CO5	Students will be able to understand about the using of different methods for human resource planning
Additive manufacturing	KME 071	CO1	Understanding the basics of additive manufacturing/rapid prototyping and its advantages and disadvantages
		CO2	Understanding the role of additive manufacturing in the design process and the implications for design.
		CO3	Understanding the processes used in additive manufacturing for a range of materials and applications
		CO4	Understand the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication.
		CO5	Apply knowledge of additive manufacturing for various real-life applications
Renewabl energy resources	KOE-074	CO1	Understand the need of energy conversion and the various methods of energy storage
		CO2	Explain the field applications of solar energy
		CO3	Identify Winds energy as alternate form of energy and to know how it can be tapped
		CO4	Explain bio gas generation and its impact on environment
		CO5	Understand the Geothermal &Tidal energy, its mechanism of production and its applications


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Measurement & Metrology Lab	KME 751	CO1	Understand the basic principles of instrumentation for measurement of surface finish, strain, temperature, pressure and flow.
		CO2	Understand the principle and operation of Coordinate Measuring Machine (CMM).
		CO3	Apply Sine Bar, Slip Gauges, Bevel Protractor, Stroboscope, Dial Indicator etc. for measurement of different attributes.
		CO4	Apply the basic concepts of limits, fits & tolerances for selective assembly
Project management & entrepreneurship	KHU-802	CO1	Understand the theories of entrepreneurship and entrepreneurial programs.
		CO2	Understand and analyze innovative business ideas and market opportunities.
		CO3	Understand the importance of project management and project's life cycle.
		CO4	Understand and analyze project finance and project report.
		CO5	Analyze Social sector perspectives and social entrepreneurship
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Quality Management	KOE-085	CO1	Given a product or a service type, the student manager will be able to enumerate and justify the dimensions of product quality or service quality for the same.
		CO2	Given the quality gurus (Deming/ Juran/ Taguchi/ Crosby), the student manager will be able to justify their philosophies/ contributions in Quality Management.
		CO3	Given a quality problem/ failure mode, the student manager will be able to identify causes and sub causes of the effect/ problem draw and justify Ishikawa Diagram.
		CO4	Given the defective item analysis (type of defect, frequency, number of defects), the student manager will be able to draw and justify the Pareto chart to prioritize the defects.
		CO5	For a given type of organization, the student manager will be able to enlist and justify the four levels of benchmarking and/ or enlist and brief seven step benchmarking model


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