

**K L UNIVERSITY**  
**DEPARTMENT OF MECHANICAL ENGINEERING**  
**MINUTES OF BOARD OF STUDIES MEETING**

The department Board of Studies meeting was held on 26/04/2016 at 11:00 A.M. in the HoD Chamber.

**Agenda of the Meeting:**

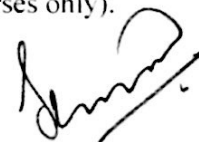
1. To consider the proposed 2016-17 admitted batch B. Tech Curriculum revision and make recommendations to the Academic Council KLU for approval of the same.
2. Any other points with permission of the Chair.

The following members were present:

1. Dr.A.Srinath
2. Dr. S. S. Rao
3. Dr. K. V. Ramana
4. Dr. K. Jayanendra Babu
5. Dr. K. L. Narayana
6. Dr. Y. V. Hanumantha Rao
7. Dr. B. Raghu kumar
8. Dr. B. Nageswara Rao
9. Dr. V. L. Krishnan
10. Dr.T.V.Rao
11. Dr. J.Ravindra
12. Dr. Md. AbidAli
13. Dr. G. Diwakar
14. Dr. S. Madhusudhan
15. Mr. D. V. A. Rama Sastry
16. Mr. M.B.S.Sreekar Reddy
17. Mr. K.Murahari
18. Mr. T. Vijai Kumar
19. Mr. T. Eswar Rao
20. Mr. A.V.S Ramprasad

The Board of Studies of the department of Mechanical Engineering made the following resolutions:

1. The following courses are recommended for addition/removal:
  - a. Signal analysis course was removed as Basics of Electrical and Electronics, Feedback and Control Systems are included which envelope the same content as that of this course.
  - b. Kinematics and Dynamics of Machines course was modified into two courses as Kinematics of Machines and Dynamics of Machines.
  - c. Applied Thermodynamics course was modified into two courses as Vapour power systems and Gas power systems.
  - d. Robotics and Mechatronics courses are offered as compulsory core courses.
2. Ecology and Environment course will be offered in final year as an online course.
3. Open Electives to be reduced to two in number in place of existing five.
4. Foreign languages course can be left as a choice based course as a part of the flexibility but not as a compulsory course.
5. The following specializations were approved by the members for the 2016-17 admitted batch and the courses under each specialization was listed in the attached annexure 1:
  - Design
  - Manufacturing
  - Thermal
  - Autotronics
  - Robotics and Automation.
6. The Revised Curriculum Structure for 2016-17 Admitted batch was approved by all members present in the meeting. The detailed Structure of 2016-17 was shown in Annexure 1.
7. It was resolved to approve all the recommendations/points mentioned in DAC meeting conducted on 12<sup>th</sup> April 2016, except point no. 5 and point no.6 was partially approved (project based labs were offered in selected core courses only).



Dr. A. Srinath

BoS Chairman-ME

**Dr. A. SRINATH**  
PROFESSOR & HEAD

Department of Mechanical Engineering  
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Vaddeswaram - 522 502.












S.No	Course Code	Course Name	L-T-P	Cr	Pre-Req.	PO												PSO		Course Status	Rationale	
						1	2	3	4	5	6	7	8	9	10	11	12	1	2			
3	16ME2207	Machine Drawing	0-0-4	2	15ME1002	2													2	2	Course is modified from previous curriculum	Aims at developing the Skill in drawing machine components in software
4	16ME2105	Metallurgy	3-0-2	4	15PH1001	1				1									1	1	Course is modified from previous curriculum	Aims at developing Skill in Material selection and Processing
5	16ME2108	Manufacturing Technology	3-0-2	4	NIL		1		2										2	2	Course is modified from previous curriculum	Aims at developing the Skill in Manufacturing process through laboratory
6	16ME2210	Kinematics of Machines	3-0-2	4	15ME1001	2	2		2										2	2	Introduced as a new course	Aims at developing the Skill in analyzing kinematics of machines through laboratory
7	16ME2211	Metal Cutting and Metal Forming	3-0-0	3	NIL		1												1	1	Introduced as a new course	Aims at developing basic knowledge in Metal cutting and forming
8	16ME2212	Vapour Power Systems	3-0-2	4	16ME1003	1	2	1	2										2	2	Introduced as a new course	Aims at developing the Skill in applying the principles of vapour power systems through laboratory
9	16ME3114	Gas Power Systems	3-0-2	4	16ME1003	2	2		2										2	2	Introduced as a new course	Aims at developing the Skill in applying the principles of Gas power systems through laboratory
10	16ME3115	Dynamics of Machines	3-0-2	4	16ME2210	2	2		2										2	2	Introduced as a new course	Aims at developing the Skill in analyzing dynamics of machines through laboratory
11	16ME3116	Machine Tools & Metrology	3-0-2	4	NIL		1		2										2	2	Introduced as a new course	Aims at developing the Skill in operating machine tools through laboratory
12	16ME3117	Internal Combustion Engines	3-0-2	4	16ME1003	2	2		2										2	2	Introduced as a new course	Aims at developing the Skill in operating IC engines through laboratory
13	16ME3118	Operations Research	3-2-0	4	NIL		1			2									2	2	Introduced as a new course	Aims at developing basic knowledge in solving business problems
14	16ME3219	Robotics	3-0-0	3	16ME2210	1		2											2	2	Introduced as a new course	Aims at developing basic knowledge in area of Robotics and their applications
15	16ME3220	Heat Transfer	3-0-2	4	16ME2104	2	2		2										2	2	Course is modified from previous curriculum	Aims at developing the Skill in applying Heat Transfer through laboratory

  
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S.No	Course Code	Course Name	L-T-P	Cr	Pre-Req.	PO												PSO		Course Status	Remarks
						1	2	3	4	5	6	7	8	9	10	11	12	1	2		
16	16ME3221	Design of Machine Elements	3-2-0	4	16ME2106	2	3	2	2									2	3	Course is modified from previous curriculum	Aims at developing basic knowledge in designing the machine elements
17	16ME3222	Computer Integrated Manufacturing	3-0-2	4	16ME3116	1		2										2	2	Introduced as a new course	Aims at developing the skill in Computer integrated manufacturing through laboratory
18	16ME3223	Production and Operations Management	3-2-0	4	Nil.	2	2	2										2	2	Course is modified from previous curriculum	Aims at developing the basic knowledge in Production and operations management
19	16ME4124	Mechanics	3-0-2	4	Nil.	2	2	2	2									2	2	Introduced as a new course	Aims at developing the skill in mechanics through laboratory
20	16ME4125	Design of Transmission Elements	3-2-0	4	16ME3221			3	2									3	2	Course is modified from previous curriculum	Aims at developing the basic knowledge in designing the transmission elements
V	PROFESSIONAL ELECTIVES																				
Design Specialization																					
1	16ME4051	Advanced Strength of Materials	3-0-0	3	16ME2107	2	2											2	2	Introduced as a new course	Aims at developing basic knowledge in applying the methods for analyzing different structures
2	16ME4052	Finite Element Methods	3-0-0	3	16ME2107	2	2		2									2	2	Introduced as a new course	Aims at developing the basic knowledge in Analysis using FEM
3	16ME4053	Advanced Vibrations and Noise Control	3-0-0	3	16ME3115	2	2											2	2	Course is modified from previous curriculum	Aims at developing basic knowledge in the understanding the concepts of Vibrations and its effects
4	16ME4054	Computer Aided Design	3-0-0	3	Nil.	2		2										2	2	Course is retained from previous curriculum	Aims at developing basic knowledge in the understanding the concepts of computer aided design
5	16ME4055	Condition Monitoring	3-0-0	3	Nil.	2												2	2	Course is modified from previous curriculum	Aims at developing basic knowledge in Monitoring and Diagnosis of Mechanical Equipments
6	16ME4056	Creep, Fatigue and Fracture Mechanics	3-0-0	3	Nil.	2	2											2	2	Course is modified from previous curriculum	Aims at developing basic knowledge in understanding the fracture mechanics

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						1	2	3	4	5	6	7	8	9	10	11	12	1	2			
7	16ME4057	Theory of Elasticity and Plasticity	3-0-0	3	NIL		2	2											2	2	Introduced as a new course	Aims at developing basic knowledge in understanding the theory of elasticity and plasticity
8	16ME4058	Mechanics of Composite Materials	3-0-0	3	NIL		2												2	2	Introduced as a new course	Aims at developing basic knowledge in understanding the mechanics of composite materials
<b>Manufacturing Specialization</b>																						
1	16ME4061	Modern Manufacturing Processes	3-0-0	3	NIL		1	1											1	1	Course is retained from previous curriculum	Aims at developing basic knowledge in the area of Manufacturing
2	16ME4062	Advanced Materials	3-0-0	3	NIL		1	1											1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
3	16ME4063	Additive Manufacturing	3-0-0	3	NIL		1	1											1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
4	16ME4064	Automation In Manufacturing	3-0-0	3	NIL			1											1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
5	16ME4065	Tool Engineering and Design	3-0-0	3	NIL			1											1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
6	16ME4066	Flexible Manufacturing Systems	3-0-0	3	NIL			1											1	1	Course is retained from previous curriculum	Aims at developing basic knowledge in the area of Manufacturing
7	16ME4067	Smart Materials	3-0-0	3	NIL			1	1										1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
8	16ME4068	Machine Tool Design	3-0-0	3	NIL			1	1										1	1	Introduced as a new course	Aims at developing basic knowledge in the area of Manufacturing
<b>Thermal Specialization</b>																						
1	16ME4071	Refrigeration and Air Conditioning	3-0-0	3	NIL		2	2											2	2	Course is retained from previous curriculum	Aims at developing basic knowledge in the area of Thermal Engineering
2	16ME4072	Non-Conventional Energy Sources	3-0-0	3	NIL		2	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Thermal Engineering
3	16ME4073	Power Plant Engineering	3-0-0	3	NIL		2	2											2	2	Course is retained from previous curriculum	Aims at developing basic knowledge in the area of Thermal Engineering
4	16ME4074	Automobile Engineering	3-0-0	3	NIL		1	1											1	1	Course is retained from previous curriculum	Aims at developing basic knowledge in the area of Thermal Engineering
5	16ME4075	Advanced Thermodynamics	3-0-0	3	17ME2106		2	2											2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Thermal Engineering

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S.No	Course Code	Course Name	L-T-P	Cr	Pre-Req.	PO												PSO		Course Status	Rationale	
						1	2	3	4	5	6	7	8	9	10	11	12	1	2			
6	16ME4076	Renewable Energy Technology	3-0-0	3	NIL		2	2											2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Thermal Engineering
7	16ME4077	Compressible Fluid Flow	3-0-0	3	NIL		2	2											2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Thermal Engineering
8	16ME4078	Heat Pipe: Theory, Design and Applications	3-0-0	3	NIL		3	3											3	3	Introduced as a new course	Aims at developing basic knowledge in the area of Thermal Engineering
<b>Autronics Specialization</b>																						
1	16ME4081	Automotive Sensor and Applications	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Autronics
2	16ME4082	Autotronics	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Autronics
3	16ME4083	Electronic Engine Management System	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Autronics
4	16ME4084	Instrumentation in Automotive Industries	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Autronics
5	16ME4085	Mechatronics System Design	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Autronics
<b>Robotics and Automation Specialization</b>																						
1	16ME4091	Artificial Intelligence for Robotics	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Robotics and Automation
2	16ME4092	Automation System Design	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Robotics and Automation
3	16ME4093	Industrial Automation and Control	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Robotics and Automation
4	16ME4094	Industrial Hydraulic and Pneumatic Systems	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Robotics and Automation
5	16ME4095	Industrial Robotics and Material Handling Systems	3-0-0	3	NIL		1	2	2										2	2	Introduced as a new course	Aims at developing basic knowledge in the area of Robotics and Automation

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S.No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
15	16ME21 08	MANUFACTURING TECHNOLOGY	4	CO1	Understand and appreciate the breadth and depth of the field of manufacturing technology.		1												1	1			
				CO2	Understand various casting procedures and melting practices used for producing different products.			1													1	1	
				CO3	Understand various special casting approaches used for producing precision components.				1													1	1
				CO4	Understand various welding methods for joining metals and alloys.					1												1	1
				CO5	Gain hands on experience in converting a given raw material into desired shape and size by applying suitable casting and welding processes.							2										1	1
16	16ME21 04	FLUID MECHANICS & HYDRAULIC MACHINES	4	CO1	Understand physical laws related to fluid statics and buoyancy.		1	1											1	1			
				CO2	Apply continuity, Euler's and Bernoulli's equations in various fluid flow situations.		2	2												2	2		
				CO3	Understand and apply momentum equation and boundary layer concepts to flow through pipes and to impact of jets.		2	2													1	1	
				CO4	Apply fluid dynamical principles to hydraulic machines.		2	2													2	2	
				CO5	Conduct experiments on various hydraulic machines like turbines and pumps						2											2	2
17	16ME 2210	KINEMATICS OF MACHINES	4	CO1	Identify various possible 4 link mechanisms and their inversions and applicability		1	1											1	1			
				CO2	Analyze mechanisms kinematically using velocity and acceleration diagrams		2	2												2	2		
				CO3	Analyze cam profiles and the motion of their followers		2	2												2	2		
				CO4	Analyze gears and gear trains kinematically		2	2												2	2		
				CO5	Apply the theoretical concepts to conduct various experiments to Analyze Mechanism . gear trains and draw Cam Profile.						2										2	2	
				CO1	Apply Cauchy-Riemann equations to test the analyticity of a complex function and Compute the complex integrals, using Cauchy theorem and Cauchy Integral formulae.		1																

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						1	2	3	4	5	6	7	8	9	10	11	12	1	2					
27	16ME 3116	MACHINE TOOLS AND METROLOGY	4	CO1	Understand the working of standard machine tools such as lathe, milling, drilling, grinding, and allied machines.		1													1	1			
				CO2	Understand and principles and design considerations of jigs and fixtures used in various machining operations.		1															1	1	
				CO3	Understand the procedures to measure the geometrical details of various mechanical elements and assemblies using linear and angular measuring instruments.		1																1	1
				CO4	Understand the procedures to measure the surface roughness and roundness of given mechanical components.		1																1	1
				CO5	Gain hands on experience on usage of various machining processes to convert a given raw material into desired shape and size and to measure the geometrical and surface quality of the mechanical components.				2														1	1
28	16ME 3117	INTERNAL COMBUSTION ENGINES	4	CO1	Analyze various air standard cycles and their performance		2	2												1	1			
				CO2	Understand the working principles of 2-stroke and 4-stroke engines, SI and CI Engines.		1															1	1	
				CO3	Understand fuel supply system and combustion phenomenon in SI and CI Engines.		1															1	1	
				CO4	Analyze and evaluate performance of SI and CI Engines.		2			2													2	2
				CO5	Conduct experiments on SI and CI Engines, analyze and interpret the experimental data and observations.					2													2	2
29	16ME 3118	OPERATIONS RESEARCH	4	CO1	Identify Optimum solutions for various single objective problems using Linear Programming models.		1													1	1			
				CO2	Identify Optimum Solutions through Transportation and Assignment models		1															1	1	
				CO3	Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models		1															1	1	
				CO4	Solve project management problems using CPM, PERT and Crashing		2															2	2	
				CO5	Solve Various Linear Programming, Transportation, Assignment, Game Theory and Simulation models through POM Software					2												2	2	
				CO1	Understand the concept of robotics with respect to their anatomy, classification and effectors.		1												1	1				

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
30	16ME 3219	ROBOTICS	3	CO2	Analyze a suitable sensors for robotic system design with respect to their applications.			2											2	2			
				CO3	Ability to solve the kinematics for robot manipulator																2	2	
				CO1	Understand laws of heat transfer and apply Fourier law of conduction for one dimensional heat conduction to engineering problems.	2	2														1	1	
31	16ME 3220	HEAT TRANSFER	4	CO2	Analyze steady state conduction problems involving internal heat generation and extended surfaces and one dimensional unsteady state heat conduction problems.	2	2												2	2			
				CO3	Apply principles of convection, boiling and condensation and evaluate convective heat transfer coefficient for different flow situations.	2	2														2	2	
				CO4	Design of heat exchangers: Understand principles of radiation and evaluate radiative heat transfer between two bodies.	2	2															2	2
				CO5	Conduct experiments and demonstrate heat transfer phenomena involving conduction, convection and radiation.						2											2	2
				CO1	Understand the basics concepts, analyze the different stresses and apply design principles for static and fatigue strength of machine elements	2																1	1
32	16ME 3221	DESIGN OF MACHINE ELEMENTS	4	CO2	Design the appropriate fastening technique			3											2	2			
				CO3	Design the power transmission elements such as keys, shafts and couplings			3													2	2	
				CO4	Design the appropriate springs such as helical or leaf springs			3														2	2
				CO5	Analyze machine elements using ANSYS software				2	2												2	2



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						1	2	3	4	5	6	7	8	9	10	11	12	1	2			
33	16ME 3222	COMPUTER INTEGRATED MANUFACTURING NG	4	CO1	Understand the basic fundamentals of computer aided design and manufacturing		1												1	1		
				CO2	Explain the basic concepts of NC and CNC programming in machining		1													1	1	
				CO3	Learn the basic concepts of group technology and flexible manufacturing systems.		1														1	1
				CO4	Learn the basic concepts of computer aided process planning		1														1	1
				CO5	Gain hands on experience in converting a given raw material into desired shape and size by applying suitable casting and welding processes.			2														1
34	16ME 3223	PRODUCTION AND OPERATION MANAGEMENT	4	CO1	Apply various work-study techniques to determine the standard time and efficiency.		2												2	2		
				CO2	Analyze various quality control techniques for bringing out the best quality output.		2													2	2	
				CO3	Apply various production scheduling techniques to optimize productivity & Forecast the future demand for the product		2														2	2
				CO4	Apply various strategies to optimize the Inventory cost		2														2	2
				CO5	Validate the theoretical concepts by doing the experiments in the laboratory			2													2	2
35	17 MB 4057	ECONOMICS FOR ENGINEERS	2	CO1	Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, benefit-cost ratio													2				
				CO2	Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions															2		
				CO3	Compute the depreciation of an asset using standard depreciation techniques to assess its impact on present or future value															2		
				CO4	Apply all mathematical approach models covered in solving engineering economics problems															2		

*[Signature]*  
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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs						
						1	2	3	4	5	6	7	8	9	10	11	12	1	2					
36	16ME 4124	MECHATRONIC S	4	CO1	Understand the role of sensors and transducers for control systems	2														1	1			
				CO2	Apply the concepts of control systems in the field of automation.			2														2	2	
				CO3	Acquire ability to analyze and simulate response of a control systems				2														2	2
				CO4	Apply the principles of PLCs in the design of control systems to achieve desired performance characteristics			2															2	2
				CO5	Modelling of different systems with the help of control systems concepts and controllers to solve the engineering problems.	2																	2	2
37	16ME 4125	DESIGN OF TRANSMISSION ELEMENTS	4	CO1	Design and selection of various belt and chain drives			3												2	2			
				CO2	Design and Selection of the suitable bearing for the given loading condition			3													2	2		
				CO3	Analyze kinematic and dynamic aspects in design of brakes, clutches and IC engine components			3														2	2	
				CO4	Design and analysis of different types of gear drives			3														2	2	
				CO5	Analyze machine elements using analysis software				2													2	2	
38	17GN10 01	ECOLOGY AND ENVIRONMENT	2	CO1	Understand the importance of Environmental education and conservation of natural resources.					1														
				CO2	Understand the importance of ecosystems and biodiversity.																			
				CO3	Apply the environmental science knowledge on solid waste management, disaster management and EIA process.							2												



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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs										
						1	2	3	4	5	6	7	8	9	10	11	12	1	2									
43	16ME 4054	COMPUTER AIDED DESIGN	3	CO1	Understand the Fundamentals of CAD and display devices	1														1	2							
				CO2	Apply the concept of geometric modeling	2																1	1					
				CO3	Able to apply concept of Surface and solid modeling	2																	2	2				
				CO4	Application of various Geometric transformations	2																	1	1				
44	16ME 4055	CONDITION MONITORING	3	CO1	Understand the types of Maintenance Techniques	1															1	1						
				CO2	Diagnose fault through Vibration Monitoring	2																	1	1				
				CO3	Interpret the Faults through Thermal Monitoring or Lubricant Analysis	2																		1	1			
				CO4	Apply sensors for condition monitoring	2																		1	1			
45	16ME 4056	CREEP FATIGUE AND FRACTURE MECHANICS	3	CO1	Assess the failure of unflawed structural components		2															1	1					
				CO2	Assess the fatigue life of structural components under the specified load spectrum		2																	1	1			
				CO3	Evaluate the fracture toughness and assess the life of flawed structural components		2																		2	2		
				CO4	Assess the life of structural components under creep		2																		1	1		
46	16ME 4057	THEORY OF ELASTICITY AND PLASTICITY	3	CO1	Analyze stresses and strains in planes in elastic or plastic region	2	2																2	2				
				CO2	Solve 2-D problems in rectangular Components	2	2																		1	1		
				CO3	Analyze stresses and strains in 3-D problems	2	2																			2	2	
				CO4	Analyze Beams and frames in plasticity applications	2	2																			2	2	
47	16ME 4058	MECHANICS OF COMPOSITE MATERIALS	3	CO1	Know the composite materials and manufacturing methods	1																		1	1			
				CO2	Understand the behaviour of composite Lamina	1																				1	1	
				CO3	Know the properties of various types composite materials	1																					1	1
				CO4	Apply Failure theories to calculate stresses in composite materials	2																					2	2

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
48	16ME 4061	MODREN MANUFACTURI NG PROCESSES	3	CO1	To classify and understand the need of Non-Traditional Manufacturing Processes.		1												1	1			
				CO2	To understand the working principle, mechanism of metal removal and the effect of various process parameters on its performance of various Non-Traditional Machining Processes.		1														1	1	
				CO3	To understand the working principle and the effect of various process parameters on its performance of various Non-Traditional Welding Processes.		1															1	1
				CO4	To understand the working principle of various Non-Traditional Forming Processes.		1															1	1
49	16ME 4062	ADVANCED MATERIALS	3	CO1	Ability to identify different types of optimization problems		1												1	1			
				CO2	Understand basic concepts in solving nonlinear optimization problems		1													1	1		
				CO3	Understand optimality conditions for unconstrained and constrained optimization problems and be able to apply them in verifying the optimality of a solution		1														1	1	
				CO4	Understand basics of choosing and implementing optimization methods		1														1	1	
50	16ME 4063	ADDITIVE MANUFACTURI NG	3	CO1	To be able to properly distinguish between the hype and realities of additive manufacturing		1												1	1			
				CO2	To understand the basic AM processes, and the limitations and advantages of each.		1													1	1		
				CO3	To understand the differences between traditional processes and additive manufacturing production, including the differences in design methodology.		1														1	1	
				CO4	To use AM terminology properly and understand the role and importance of standards in the additive manufacturing industry.		1														1	1	



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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs			
						1	2	3	4	5	6	7	8	9	10	11	12	1	2		
51	16ME 4064	AUTOMATION IN MANUFACTURI NG	3	CO1	Understand the strategies and components of automation in productions			1										1	1		
				CO2	Analyze the automated flow lines in production systems.			1											2	2	
				CO3	Analyze and design the assembly lines and materials handling systems of production systems.			1												2	2
				CO4	Develop the adoptive system for a machine cell			1												2	2
52	16ME 4065	TOOL ENGINEERING AND DESIGN	3	CO1	Develop the ability to design cutting tools for given single component.			2										1	1		
				CO2	Design and development of various die configurations.			2											2	2	
				CO3	Design and development of jigs for given component.			2												2	2
				CO4	Design and development of fixtures for given component.			2												2	2
53	16ME 4066	FLEXIBLE MANUFACTURI NG SYSTEMS	3	CO1	Analyze various production schedules and plant layouts.			1										2	2		
				CO2	Apply the concept of group technology to the development of FMS.			1											2	2	
				CO3	Identify hardware and software components of FMS.			1												1	1
				CO4	Analyze materials handling and storage system in FMS.			1												2	2




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S.No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												Total				
						1	2	3	4	5	6	7	8	9	10	11	12	1	2			
54	16ME4067	SMART MATERIALS	3	CO1	Understand the behavior and applicability of Piezoelectric materials in designing smart structures and materials			1										1	1			
				CO2	Understand the behavior and applicability of Shape memory alloys in designing smart structures and materials				1											1	1	
				CO3	Understand the behavior and applicability of Magnetostrictive materials in designing smart structures and materials			1													1	1
				CO4	Understand basic motions involved in a machine tool			1													1	1
55	16ME4068	MACHINE TOOL DESIGN	3	CO1	Design machine tool structures						1								2	2		
				CO2	Design and analyze systems for specified speeds and feeds				1											1	1	
				CO3	Select subsystems for achieving high accuracy in machining					1											1	1
				CO4	Analyze COP of different refrigeration cycles with different methods of refrigeration using different refrigerants			2	2												2	2
56	16ME4071	REFRIGERATION & AIR-CONDITIONING	3	CO1	Analyze the performance of Vapor Compression Refrigeration with modification of cycle and its components			2	2										2	2		
				CO2	Understanding the working of Cascade systems for low temperature Production and of VAK system			1												1	1	
				CO3	Analyze cooling load for comfort and industrial air conditioning on basis of processes on psychrometric charts and its components			2	2												2	2
				CO4																		

  
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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
57	16ME 4072	NON- CONVENTIONAL ENERGY SOURCES	3	CO1	Understand and analyze various solar thermal applications.	2	2												1	1			
				CO2	Analyze the performance of tidal, wave and Ocean thermal energy conversion (OTEC) systems		2				2										2	2	
				CO3	Understand and analyze the operation of wind, geothermal, biomass and bio-gas power generation.	2	2															1	1
				CO4	Understand and analyze the operation of solar photovoltaic cells fuel cells and the phenomenon of fusion.	2	2															1	1
58	16ME 4073	POWER PLANT ENGINEERING	3	CO1	Understand the working of system and subsystems of Hydro Electric and Diesel power plants.	2	2												1	1			
				CO2	Understand the working of system and subsystems of Thermal and nuclear power plants and to draw their layout diagrams	1	1														1	1	
				CO3	Calculate the various factors of power plant economics and understand power generation through Non-conventional energy sources.	2	2															2	2
				CO4	Understand various direct energy conversion systems, pollution and methods to control pollution.	1																1	1
59	16ME 4074	AUTOMOBILE ENGINEERING	3	CO1	Understand different types of chassis, engine components, fuel systems and its working principles	1	1												1	1			
				CO2	Understand different components of transmission system, cooling and lubrication systems	1	1														1	1	
				CO3	Understand different components of suspension, steering and braking systems	1	1															1	1
				CO4	Understand different electric and electronic systems used in automobiles and pollution control techniques used in SI and CI engines.	1	1															1	1



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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
60	16ME 4075	ADVANCED THERMODYNA MICS	3	CO1	Understanding the concepts of exergy, thermodynamic potential and calculation of exergy of a system	1													1	1			
				CO2	Understanding kinetic theory of gases and intermolecular forces		1														1	1	
				CO3	Understanding various methods of statistical distribution of particles	1																1	1
				CO4	Ability to construct figures for particle allocations depending on various probability distributions			2														1	1
61	16ME 4076	RENEWABLE ENERGY TECHNOLOGY	3	CO1	Understand different types of Renewable Energy Sources and Analyzing the energy production.	2	2												1	1			
				CO2	Understand the principles of OTEC and wind energy and analyze wind speed effects in power generation.	2	2													1	1		
				CO3	Understand different conversion techniques of biomass to useful fuel or energy.	2	2														1	1	
				CO4	Understand different conversion techniques of Geo-Thermal energy.	2	2														1	1	
62	16ME 4077	COMPRESSIBLE FLUID FLOW	3	CO1	To understand and apply compressible flow theory in various propulsion devices.	1													1	1			
				CO2	To solve the gas dynamics design problems related to high speed aerodynamics, rocket and missile propulsion, steam and gas turbines, and high speed turbo-compressors.	2	2													1	1		
				CO3	To acquire knowledge on the measuring devices and techniques being used in compressible flows.	1															1	1	
				CO4	To understand various aspects of the wave phenomena including the normal and oblique shock waves.	1															1	1	
63	16ME 4078	HEAT PIPE: THEORY, DESIGN & APPLICATIONS	3	CO1	Understand the working principle and operational characteristics of heat pipes	1	1												1	1			
				CO2	Understand and interpret the heat pipe operating limits while modeling heat pipes for practical applications	2	2													1	1		
				CO3	Understand design and manufacturing considerations of heat pipes for a given industrial application	2	2														1	1	
				CO4	Develop Designs for different applications including thermal management of electronic devices, space applications, power plant heat exchangers and HVAC equipment	3	3															2	2

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
64	16ME 4081	AUTOMOTIVE SENSOR AND APPLICATIONS	3	CO1	Learn the sensor classification and sensor product selection guide.	1													1	1			
				CO2	Analyze the measurement of engine parameter using sensor.				2												2	2	
				CO3	Apply required sensors and actuators for automotive applications			2														2	2
				CO4	Analyze the sensors for intelligent transport systems			2														2	2
65	16ME 4082	AUTOTRONICS	3	CO1	Understand the automotive electronics for engine management system	1													1	1			
				CO2	Analyze required sensors and actuators for an automotive application				2												2	2	
				CO3	Apply the suitability of a control system for automotive application			2														2	2
				CO4	Ability to analyze of electronic system for automotive applications			2														1	1
66	16ME 4083	ELECTRONIC ENGINE MANAGEMENT SYSTEM	3	CO1	Understand the automotive instruments and automotive sensors	1													1	1			
				CO2	Learn the measurement of engine parameter by using sensor.				1												1	1	
				CO3	Acquire ability to analyze the electronic fuel injection system				2													1	1
				CO4	Apply the principles of digital control techniques and the application of on board diagnosis			2														2	2
67	16ME 4084	INSTRUMENTATION IN AUTOMOTIVE INDUSTRIES	3	CO1	Understand the knowledge of various Measuring Instruments to design a simple Instrumentation system	1													1	1			
				CO2	Analyze the various instruments and use them in various fields				2												2	2	
				CO3	Learn and apply the measuring instruments in various industries application			2														1	1
				CO4	Analyze suitable instrument for a given application			2														2	2

  
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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
68	16ME 4085	MECHATRONIC S SYSTEM DESIGN	3	CO1	Understand the approach used for mechatronic system design and relevant considerations	1													1	1			
				CO2	Apply the suitable sensors and actuators used in a Mechatronic system			2													2	2	
				CO3	Analyze signal conditioning interface in a Mechatronic system and implementation of control systems				2													2	2
				CO4	Modeling and Simulation for the Mechatronic System design perspective			2														1	1
69	16ME 4091	ARTIFICIAL INTELLIGENCE FOR ROBOTICS	3	CO1	Understand the concepts of AI															1	1		
				CO2	Apply basic principles of AI in solutions that require problem solving and planning.				2												2	2	
				CO3	Apply basic principles of AI in solutions that require problem solving, planning, reasoning and learning					2												2	2
				CO4	Analyze AI in Robotics			2														2	2
70	16ME 4092	AUTOMATION SYSTEM DESIGN	3	CO1	Understand the design principles of automation and its application in an automated manufacturing system															1	1		
				CO2	Analyze pneumatic sub-systems of an automated manufacturing system in terms of design, operation and control aspects				2												2	2	
				CO3	Analyze hydraulic sub-systems of an automated manufacturing system in terms of design, operation and control aspects					2												2	2
				CO4	Understand programmable automation with regard to the computer integrated manufacturing system			2														1	1
71	16ME 4093	INDUSTRIAL AUTOMATION AND CONTROL	3	CO1	Understand the concepts industrial automation and measurement systems															1	1		
				CO2	Apply the controllers in automation			2													2	2	
				CO3	Analyze and select a suitable PLC system for the given application				2													2	2
				CO4	Apply the concepts of control systems for industrial automation			2														2	2

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs					
						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
72	16ME 4094	INDUSTRIAL HYDRAULIC AND PNEUMATIC SYSTEMS	3	CO1	Learn the concepts hydraulic or pneumatic actuation system	1													1	1			
				CO2	Analyze diagnose maintenance problems of hydraulic and pneumatic system																2	2	
				CO3	Analyze required components to develop an automation system using pneumatics and hydraulic system			2														2	2
				CO4	Develop circuits for controlling hydraulic and pneumatic using PLC			2														1	1
73	16ME 4095	INDUSTRIAL ROBOTICS AND MATERIAL HANDLING SYSTEMS	3	CO1	Understand the concepts of robot, sensors and their applications in robots	1													1	1			
				CO2	Learn material handling equipment used both in automated and non-automated systems			1													1	1	
				CO3	Analyze and select a suitable material handling system for the given application				2												2	2	
				CO4	Apply the various applications of robots in material handling				2												2	2	
74	16ME 40A1	AIRCRAFT SYSTEMS DESIGN	3	CO1	Understand the Design process of Aircraft	1													1	1			
				CO2	Determine the forces in Aircraft structures			2	2												1	1	
				CO3	Select the aircraft materials for manufacturing processes			2													1	1	
				CO4	Analyze stresses in Aircraft structures			2	2												2	2	
75	16ME 40A2	PRODUCT DESIGN AND DEVELOPMENT	3	CO1	Understand the principles of creativity in Design	1													1	1			
				CO2	Analyze Economics in Design			2													2	2	
				CO3	Apply Modelling techniques for a product			2													2	2	
				CO4	Determine the cost of product and know the significance to product design			2													1	1	

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome	Program Outcomes												PSOs						
						1	2	3	4	5	6	7	8	9	10	11	12	1	2					
80	16ME 5001	ADVANCED HEAT & MASS TRANSFER	3	CO1	Understand 1-D steady state conduction heat transfer	1	1												1	1				
				CO2	Apply principles of Heat Transfer to develop Mathematical model for ducts and plates	2	2														2	2		
				CO3	Analyze free and forced convection problems	2	2															2	2	
				CO4	Apply concepts of radiation heat transfer for enclosure analysis	1	1																2	2
81	16ME 5003	INCOMPRESSIBLE AND COMPRESSIBLE FLOWS	3	CO1	Understand the fundamental concepts of continuum mechanics and shock wave theory	1														1	1			
				CO2	Apply techniques for analyzing inviscid incompressible flow problem		2															2	2	
				CO3	Apply techniques for analysis of laminar and turbulent boundary layer flows		2																2	2
				CO4	Apply techniques for analysis of unsteady compressible flows.		2																2	2
82	16ME 5002	COMPUTATIONAL FLUID DYNAMICS	3	CO1	Understand Fundamentals of CFD and Derive the governing equations	2	2													1	1			
				CO2	Apply different CFD techniques to diffusion	2	2															2	2	
				CO3	Application of time integration methods for convection diffusion	2	2																1	1
				CO4	Solving N-S equations and Modeling of turbulence	2	2																1	1
83	16ME 5004	MECHANISMS DESIGN AND SIMULATION	3	CO1	Understand Kinematic principles and Structures	1	1													1	1			
				CO2	Analyze mechanisms in linkages Robotic manipulator	2	2															2	2	
				CO3	Draw Inflection circle for coupler curves	1	1																1	1
				CO4	Synthesize curve based mechanism and Cam mechanisms	2	2																1	1

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						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
84	16ME 5005	ADVANCED MECHANICS OF SOLIDS	3	CO1	Analyze Stress, strain in a deformable bodies	2	2											2	2				
				CO2	Apply Energy Methods to calculate deflections in members	1	1													2	2		
				CO3	Analyze Stresses, deflections in Straight and Curved beams	2	2														2	2	
				CO4	Determine contact stresses and deflection of bodies in contact	1	1														1	1	
85	16ME 3126	INDUSTRIAL ENGINEERING TECHNIQUES	3	CO1	Apply various work-study techniques to determine the standard time and efficiency.		2												2	2			
				CO2	Analyze various quality control techniques for bringing out the best quality output.		2														2	2	
				CO3	Apply various production scheduling techniques to optimize productivity & Forecast the future demand for the product		2															2	2
				CO4	Apply various strategies to optimize the Inventory cost		2															2	2
86	16ME 3118	OPERATIONS RESEARCH	3	CO1	Identify Optimum solutions for various single objective problems using Linear Programming models		2												1	1			
				CO2	Identify Optimum Solutions through Transportation and Assignment models		2														1	1	
				CO3	Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models		2															1	1
				CO4	Solve project management problems using CPM, PERT and Crashing		2															2	2
87	16ME 3127	ENGINEERING MANAGEMENT	3	CO1	Apply various management concepts to solve real life problems		2												2	2			
				CO2	Analyze various Economic Evaluation of alternatives and Depreciation methods		2														2	2	
				CO3	Analyze various quality control techniques for bringing out the best quality output.		2															2	2
				CO4	Apply various strategies to optimize the Inventory cost		2															2	2

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						1	2	3	4	5	6	7	8	9	10	11	12	1	2				
88	16ME 3128	WORK STUDY & ERGONOMICS	3	CO1	Calculate the basic work content of a specific job for employees of an organization. Thereby they will be able to calculate the production capacity of man power of an organization.		2												1	1			
				CO2	Analyze the existing methods of working for a particular job and develop an improved method through questioning technique by using various recording techniques		2														2	2	
				CO3	Apply ergonomic principles in the workplace or other environment		2															2	2
				CO4	Apply various plant layout and production systems to optimize productivity.		2															2	2
89	16ME 3129	OPERATIONS MANAGEMENT	3	CO1	Calculate future demand for the product in the market by applying appropriate forecasting technique.		2												1	1			
				CO2	Apply various plant layout and production scheduling techniques to optimize productivity.		2														2	2	
				CO3	Apply various production scheduling techniques to improve productivity.		2															2	2
				CO4	Analyze various quality control techniques for bringing out the best quality output.		2															2	2

  
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K L UNIVERSITY  
DEPARTMENT OF MECHANICAL ENGINEERING  
MINUTES OF DEPARTMENT ACADEMIC COMMITTEE MEETING

The Department Academic Committee meeting was conducted in HOD, Mechanical Engineering, chamber on 12<sup>th</sup> April 2016 at 1:00 pm

Agenda:

1. To discuss the feedbacks received from stake holders on curriculum
2. To propose the curriculum for B.Tech 2016-17 admitting batch
3. Any other points with the permission of the DAC chairman

The following members were present:

1. Dr.A.Srinath	Head of the Department
2. Dr.S.S.Rao	Professor
3. Dr. K.V.Ramana	Professor
4. Dr. K. L. Narayana	Dean, R & D
5. Dr.V.L.Krishnan	Robotics & Mechatronics Research Group Head
6. Dr. J.Ravindra	Thermal Research Group Head
7. Dr. B.RaghuKumar	Design and Manufacturing Research Group Head
8. T. Samuel(152070004)	M.Tech-Thermal Engineering student
9. N. Kiran Kumar(152071003)	M.Tech-Mechatronics student.
10. B. Ranjit(12007003)	IV/IV B.Tech Student
11. V.Lokesh(12007032)	IV/IV B.Tech Student
12. K.Siva Manikanta(12007057)	IV/IV B.Tech Student
13. T.Yeswanth Sai(13007121)	III/IV B.Tech Student
14. N. Siva Kumar(13007296)	III/IV B.Tech Student
15. E.L.N.R Madhukar (14004289)	II/IV B.Tech Student
16. S. Naga Lalitha Devi (14004636)	II/IV B.Tech Student

The following points were discussed and resolved:

1. The DAC discussed and resolved to recommend the integration of software tools to all the core courses of the B.Tech program and the research groups' heads are given the task of identify the respective software. course wise.
2. Upon discussing the feedback from students, the committee resolved to recommend the following to BOS
  - a. The removal of Signal Analysis course as compulsory course (Annexure 1)
  - b. The addition of Economics for Engineers as a compulsory course (Annexure 1).
3. Upon discussing the feedback from faculty, the committee resolved to recommend the changes made in Thermodynamics course (Annexure 1).
4. It is resolved to modify the syllabus for machine drawing course (Annexure 1).
5. DAC members suggested to consider. Technical English course in place of Inter personal Communication Skills and Corporate Communication Skills(Annexure 1)

6. Upon discussing the feedback from students, it was resolved to remove projects in laboratory courses, as the students are overloaded.
7. Under Manufacturing Engineering stream, the syllabus of the core courses was presented.
  - a. It is resolved to modify the syllabus of Metallurgy course (Annexure 1).
  - b. It is resolved to add Industrial visit for gaining hands-on experience for Manufacturing Technology course at an appropriate time frame as per course delivery plan/ handout.
  - c. It is suggested to trim the syllabus of Metal Cutting and Machine Tools course and combine the trimmed syllabus with Metrology course and rename the Metrology course and Machine Tools and Metrology (Annexure 1).
  - d. It is also resolved to include Production and Operations Management, Operations Research courses, under the manufacturing engineering stream (Annexure 1).
8. Under Design Engineering stream, the syllabus of two engineering science courses and six core courses was presented.
  - a. It is resolved to offer Engineering Graphics and Mechanics as engineering science courses (Annexure 1).
  - b. It is resolved to introduce Machine drawing course as core course.(Annexure 1)
  - c. It is resolved to add deflections of beams topic in the Strength of Materials course (Annexure 1).
  - d. It is suggested to add Riveted Joints in the syllabus of Design of Machine Elements (Annexure 1).
  - e. It is resolved to split Mechanisms and Machine Theory as two separate subjects Kinematics of Machines and Dynamics of Machines (Annexure 1)
  - f. It is resolved to offer Strength of Materials, Kinematics of Machines, Dynamics of Machines, Design of Machine Elements and Design of Transmission Elements as six core courses under Design Engineering stream (Annexure 1).
9. Under Thermal Engineering stream, the syllabus of one engineering science course and five core courses was presented.
  - a. It is resolved to offer Engineering Thermodynamics as engineering science course (Annexure 1).
  - b. It is resolved to offer Fluid Mechanics and Hydraulic Machinery as a single course (Annexure 1).
  - c. It is resolved to offer Vapour Power Systems, Gas Power Systems, Internal Combustion Engines and Heat Transfer as five core courses under Thermal Engineering stream (Annexure 1).
  - d. It is resolved to add Industrial visit for gaining hand-on experience for Internal Combustion Engines course and put up at appropriate level of course delivery plan/ handout.
10. Under Robotics stream, the following core course are presented
  - a. It is resolved to add Robotics course as core course (Annexure 1).
  - b. It is resolved to combine Instrumentation and Control Systems course with Mechatronics course and rename it as Mechatronics and offer as a core course (Annexure 1).

11. It was resolved to recommend to BOS to offer the following specializations under professional electives (Annexure 1).
- Design
  - Thermal
  - Manufacturing
  - Autotronics
  - Robotics and Mechatronics.
12. It is resolved to modify the syllabus of Mechanical vibrations course by adding the noise control topics (Annexure 1).
13. It is resolved to modify the syllabus of Fracture mechanics course (Annexure 1).
14. It is resolved to modify the syllabus of Condition Monitoring course (Annexure 1)
15. Upon considering above mentioned feedbacks and surveying through the policy documents in relevance to APIIC, Human Resource Development Policy, Govt. of India, National Skill Development Corporation, Govt. of India, Confederation of Indian Industries, The Associated Chambers of Commerce of India (Assocham), The National Association of Software and Services Companies (NASSCOM), ABET, NBA norms, AICTE statutory norms and American Society of Mechanical Engineers (ASME), it is resolved to propose enclosed curriculum for B.Tech-Mechanical Program for 2016-17 for BOS approval (Annexure 1).



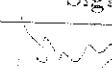
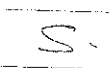
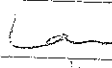
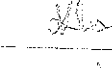
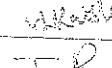


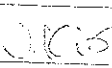
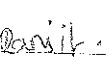
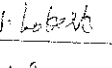
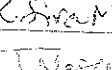
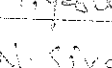

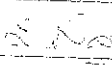
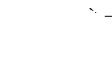

**Dr. A.Srinath**  
(Head of the Department)

**Dr. A. SRINATH**  
**PROFESSOR & HEAD**  
Department of Mechanical Engineering  
OST FIST SPONSORED DEPARTMENT  
K.L.E.F., Deemed to be University,  
Vaddeswaram - 522 502.



K L University  
Department of Mechanical Engineering  
Department Academic Committee (DAC)

The following members attended the meeting on 12<sup>th</sup> April 2016 at 1:00 pm:

S.No	Name of the member	Designation	Signature
1	Dr. A. Srinath	Professor. HOD	
2	Dr.S.S.Rao	Professor	
3	Dr. K. V. Ramana	Professor	
4	Dr. K. L. Narayana	Professor	
5	Dr. V.L.Krishnan	Professor	
6	Dr. J. Ravindra	Professor	
7	Dr. B. Raghu Kumar	Professor	
8	T. Samuel(152070004)	Student	
9	N. Kiran Kumar(152071003)	Student	
10	B. Ranjit(12007003)	Student	
11	V. Lokesh(12007032)	Student	
12	K. Siva Manikanta(12007057)	Student	
13	T.Yeswanth Sai(13007121)	Student	
14	N. Siva Kumar(13007296)	Student	
15	E.L.N.R Madhukar(14004289)	Student	
16	S. Naga Lalitha Devi (14004636)	Student	

K L E F					
Department of Mechanical Engineering					
Department Academic Committee Meeting (12/04/2016)					
Annexure 1: Proposed B.Tech 2016-17 Course Structure					
S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
<b>I</b>	<b>Humanities &amp; Social Sciences</b>				
1	Rudiments of Communication Skills	2-0-0	2	NIL	Nil
2	Professional Communication Skills	0-0-4	2	NIL	Nil
3	Technical English	2-0-0	2	NIL	New Course
4	Economics for Engineers	2-0-0	2	NIL	New Course
5	Ecology and Environment	2-0-0	2	NIL	Nil
6	Human Values and Professional Ethics	2-0-0	2	NIL	Nil
<b>II</b>	<b>Basic Sciences</b>				
1	Single Variable Calculus and Matrix Algebra	2-2-2	4	NIL	Nil
2	Multivariate Calculus	2-2-2	4	NIL	Nil
3	Engineering Chemistry	2-2-2	4	NIL	Nil
4	Complex Variables And Transforms	3-0-0	3	NIL	New Course
5	Probability and Numerical Methods	3-0-2	4	NIL	Topics added: Inferential statistics, Numerical methods
<b>III</b>	<b>Engineering Sciences</b>				
1	Engineering Materials	2-2-2	4	NIL	Nil
2	C Programming & Data Structures -I	2-4-2	5	NIL	Nil
3	C Programming & Data Structures -II	2-4-2	5	NIL	New Course
4	Introduction to Engineering	2-0-2	3	NIL	Nil
5	Mechanics	2-2-2	4	NIL	Nil
6	Engineering Graphics	0-0-6	3	NIL	Nil
7	Measurements	0-0-4	2	NIL	Nil
8	Thermodynamics	3-0-2	4	NIL	Topics added: Work & heat, First law of Thermodynamic for non flow system, First law of thermodynamics for flow system.
9	Basics of Electrical and Electronics Engineering	2-2-2	4	NIL	Nil

S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
<b>IV</b>	<b>Professional Core Courses</b>				
1	Strength of Materials	3-0-2	4	Mechanics	Topics added: Deflections of beams
2	Fluid Mechanics & Hydraulic Machines	3-0-2	4	NIL	Topics added: Buoyancy, Impact of jet, Hydraulic machines-Turbines, Hydraulic machines-Centrifugal pump
3	Machine Drawing	0-0-4	2	Engg. Graphics	Topics added: Machine drawing convection
4	Metallurgy	3-0-2	4	Engg. Materials	Topics added: Equilibrium diagrams, Surface heat treatment methods, Fuels, furnaces refractories, Extractive metallurgy
5	Manufacturing Technology	3-0-2	4	NIL	Topics added: Special casting processes
6	Kinematics of Machines	3-0-2	4	Mechanics	New Course
7	Metal Cutting and Metal Forming	3-0-0	3	NIL	New Course
8	Vapour Power Systems	3-0-2	4	Thermodynamics	New Course
9	Gas Power Systems	3-0-2	4	Thermodynamics	New Course
10	Dynamics of Machines	3-0-2	4	Kinematics of Machines	New Course
11	Machine Tools & Metrology	3-0-2	4	NIL	New Course
12	Internal Combustion Engines	3-0-2	4	Thermodynamics	New Course
13	Operations Research	3-2-0	4	NIL	New Course
14	Robotics	3-0-0	3	Kinematics of Machines	New Course
15	Heat Transfer	3-0-2	4	FM & HM	Topics added: Forced convection, Natural convection, Radiation heat exchange between two bodies
16	Design of Machine Elements	3-2-0	4	Strength of Materials	Topics added: Bolted joints, Riveted joints, Keys
17	Computer Integrated Manufacturing	3-0-2	4	Machine tools and Metrology	New Course
18	Production and Operations Management	3-2-0	4	NIL	Topics added: Work study, work measurement, Work Sampling, Inventory control
19	Mechatronics	3-0-2	4	NIL	New Course
20	Design of Transmission Elements	3-2-0	4	Design of machine elements	Topics added: Bevel gears, Worm gears

S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
V	<b>Professional Electives</b>				
<b>Design Specialization</b>					
1	Advanced Strength of Materials	3-0-0	3	NIL	New Course
2	Finite Element Methods	3-0-0	3	NIL	New Course
3	Advanced Vibrations and Noise Control	3-0-0	3	NIL	Topics added: Characteristics & sources of vibrations, vibrations measurement technics and control, sources of noise, noise measurement technics and control, noise measuring instruments
4	Computer Aided Design	3-0-0	3	NIL	Nil
5	Condition Monitoring	3-0-0	3	NIL	Topics added: Thermal monitoring, Sensors for condition monitoring, Electrical monitoring, Introduction to expert system
6	Creep, Fatigue and Fracture Mechanics	3-0-0	3	NIL	Topics added: Analysis of stresses and strains in three-dimensions, Factors influencing fatigue behavior of metals, Creep behavior of metals
7	Theory of Elasticity and Plasticity	3-0-0	3	NIL	New Course
8	Mechanics of Composite Materials	3-0-0	3	NIL	New Course
<b>Manufacturing Specialization</b>					
1	Modern Manufacturing Processes	3-0-0	3	NIL	Nil
2	Advanced Materials	3-0-0	3	NIL	New Course
3	Additive Manufacturing	3-0-0	3	NIL	New Course
4	Automation In Manufacturing	3-0-0	3	NIL	New Course
5	Tool Engineering and Design	3-0-0	3	NIL	New Course
6	Flexible Manufacturing Systems	3-0-0	3	NIL	Nil



S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
7	Smart Materials	3-0-0	3	NIL	New Course
8	Machine Tool Design	3-0-0	3	NIL	New Course
<b>Thermal Specialization</b>					
1	Refrigeration and Air Conditioning	3-0-0	3	NIL	Nil
2	Non-Conventional Energy Sources	3-0-0	3	NIL	New Course
3	Power Plant Engineering	3-0-0	3	NIL	Nil
4	Automobile Engineering	3-0-0	3	NIL	Nil
5	Advanced Thermodynamics	3-0-0	3	NIL	New Course
6	Renewable Energy Technology	3-0-0	3	NIL	New Course
7	Compressible Fluid Flow	3-0-0	3	NIL	New Course
8	Heat Pipe: Theory, Design and Applications	3-0-0	3	NIL	New Course
<b>Autotronics Specialization</b>					
1	Automotive Sensor and Applications	3-0-0	3	NIL	New Course
2	Autotronics	3-0-0	3	NIL	New Course
3	Electronic Engine Management System	3-0-0	3	NIL	New Course
4	Instrumentation in Automotive Industries	3-0-0	3	NIL	New Course
5	Mechatronics System Design	3-0-0	3	NIL	New Course
<b>Robotics and Automation Specialization</b>					
1	Artificial Intelligence for Robotics	3-0-0	3	NIL	New Course
2	Automation System Design	3-0-0	3	NIL	New Course
3	Industrial Automation and Control	3-0-0	3	NIL	New Course
4	Industrial Hydraulic and Pneumatic Systems	3-0-0	3	NIL	New Course

S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
5	Industrial Robotics and Material Handling Systems	3-0-0	3	NIL	New Course
<b>VI</b>	<b>OPEN ELECTIVES</b>				
1	Aircraft Systems Design	3-0-0	3	NIL	New Course
2	Product Design and Development	3-0-0	3	NIL	New Course
3	Biomechanics for Tissues and Joints	3-0-0	3	NIL	New Course
4	Mechatronics	3-0-0	3	NIL	Nil
5	Robotics	3-0-0	3	NIL	Nil
6	Condition Monitoring	3-0-0	3	NIL	New Course
<b>VII</b>	<b>PROJECT</b>				
1	Industrial Training	0-0-4	2	NIL	Nil
2	Mini Project	0-0-4	2	NIL	New Course
3	Term Paper	0-0-4	2	NIL	Nil
4	Minor Project	0-0-4	2	NIL	Nil
5	Practice School/PROJECT	0-0-24	10	NIL	Nil

S.No	Course Name	L-T-P	Cr	Pre-Req.	Remarks
5	Industrial Robotics and Material Handling Systems	3-0-0	3	NIL	New Course
<b>VI</b>	<b>OPEN ELECTIVES</b>				
1	Aircraft Systems Design	3-0-0	3	NIL	New Course
2	Product Design and Development	3-0-0	3	NIL	New Course
3	Biomechanics for Tissues and Joints	3-0-0	3	NIL	New Course
4	Mechatronics	3-0-0	3	NIL	Nil
5	Robotics	3-0-0	3	NIL	Nil
6	Condition Monitoring	3-0-0	3	NIL	New Course
<b>VII</b>	<b>PROJECT</b>				
1	Industrial Training	0-0-4	2	NIL	Nil
2	Mini Project	0-0-4	2	NIL	New Course
3	Term Paper	0-0-4	2	NIL	Nil
4	Minor Project	0-0-4	2	NIL	Nil
5	Practice School/PROJECT	0-0-24	10	NIL	Nil