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:

- 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.
 - 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.
- 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.
- 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.
- 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 12th 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 Engineerings I HIST SPONSORED DEPARTMENT
K.L.E.F., Deemed to be University,
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Heat Transfer	Robotics	Operations Research	Internal Combustion Engines	16ME3116 Machine Tools & Metrology	Dynamics of Machines	Gas Power Systems	Vapour Power Systems	Metal Cutting and Metal Forming	Kinematics of Machines	16ME2108 Manufacturing Technology	Metallurgy	Machine Drawing	Course Name
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Dr. A. SRINA
PROFESSOR &
Department of Mechanica
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K.L. University, Vaddeswa

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Dr. A. SRINATH
PROFESSOR & HEAD
PROFESSOR & HEAD
Department of Mechanical Engine
Department of Mechanical Engine
NST FIST SPONSORE
K.L. University, Vaddeswaram-5

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Industrial Robotics and Material Handling Systems	Industrial Hydraulic and Pneumatic Systems	Industrial Automation and Control	Automation System Design	Artificial Intelligence for Robotics	Robotics and Automation Specialization	Mechatronics System Design	Instrumentation in Automotive Industries	Electronic Engine Management System	Autotronics	Automotive Sensor and Applications	ization	Heat Pipe: Theory, Design and Applications	Compressible Fluid Flow	Renewable Energy Technology	Course Name
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Dr. A. SRINATH
PROFESSOR & HEAD
Department of Mechanical Engineering
DST FIST SPONSORED

K.L. University, Vaddeswaram-522

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-									_	Understands the role of electronic energy band structures of solids in governing various electrical and optical properties of materials.	CO4				-
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1									_	Understands magnetic properties of materials and identifies their role in classification soft & hard magnetic materials having specific engineering applications.	CO2				
1									_	Understands structure of crystalline solids, kinds of crystal imperfections and appreciates structure-property relationship in crystals.	COI				
						2				Verify the solution of problems through MATLAB.	COS				\$. · · \$:
-									2	Model physical problems mathematically as a system of linear equations and solve them by analytical and numerical methods. Also, determine the nature of Ouadratic form using Eigen values.	CO4				
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									2	Model physical laws and relations mathematically as second/higher order differential equations, solve by analytical method and interpret the solution.	CO2		SINGLE		
									2	Model the physical laws and relations mathematically as a first order differential equations, solve by analytical and numerical methods also interpret the solution.	COI				
PSOs	11 12	10 1	9	Program Outcomes 5 6 7 8	gram O	Prog	4	2 3	-	Description of the Course Outcome	CONO	Credits	Course Title	Code	SNo
										Course Articulation Matrix				Course	
									comes						
									NG	DEPARTMENT OF MECHANICAL ENGINEERING					
										K L UNIVERSITY					



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Department of Mechanical Engineering

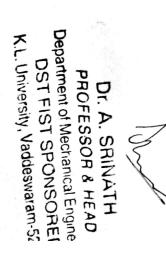
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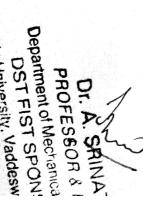
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		01 01				t.	15GN10				15CS100			•	Code
		MECHANICS				ENGINEERING	INTRODUCTION TO				1 PROGRAMMING AND DATA STRUCTURES-1	C			Course Title
		4					Ž ن				-I 3G				Credits
COS	CO4	соз	C02	COI	CO4	CO3	C02	COI	COS	C04	CO3	C02	CC	+	its CO NO
											-		CO1,		O
Understand the engineering systems to prepare and demonstrate the models with the help of mechanics concept to solve the engineering problems.	Analyze the rigid bodies under translation and rotation with and without considering forces.	Apply the concept of centroid & centre of gravity to determine moment of inertia.	Analyze co-planar and non-co-planar system of forces.	Understand the concept of forces and apply the static equilibrium equations.	Apply to knowledge of critical thinking to frame real-world problems and provide basic solution approach to such problems from engineering perspective	Understand the aspects of critical thinking and problem solving in engineering	Understand and analyze the possible career options in Engineering and develop strategic plan, career targets and mechanism to achieve the same.	Understand the basic principles of engineering design	Apply the knowledge obtained by the course to solve real world problems.	Implement Binary Trees.	Implement Linear Data Structures and compare them.	Interpret & Illustrate user defined C functions and different operations on list of data.	Illustrate how problems are solved using computers and programming.		Description of the Course Outcome
2	2	2	2	2						2	2	2	2	-	
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12							2	2			_			8	Program Outcomes
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Dr. A. SRÎNATH
PROFESSOR & HEAD
Department of Mechanical Engineer
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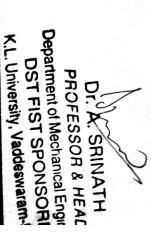
		Course																
	200	Code	Course Title	Credits	CO NO	Description of the Course Outcome			Pro	gram	Program Outcomes	mes					<u> </u>	PSOs
					COI	Determine extreme values for functions of several variables	2 2	3	2 3	6	7	∞	9	10	=	12	_	2
					C02	Determine area, volume through multiples integrals	2		2									
	6	15MT12 03	MULTIVARIATE CALCULUS	4	СОЗ	Apply the concepts of vector calculus to calculate the gradient, directional derivative, arc length, areas of surfaces and volume of solids in practical problems	2		2									
					CO4	Obtain analytical and numerical solutions of Heat and wave equations	2		2									
					COS	Verify the solution of problems through MATLAB	2		2									
					CO1	Draft Orthographic views, projections of planes and solids manually and by using CAD software Tool (AutoCAD)			2							2	ь	1
	7	15ME10 02	ENGINEERING GRAPHICS	ω	CO2	Drafting Sectional views, Isometric views, development of surfaces and perspectives views manually and by using AutoCAD			2							2	ь	1
T					СОЗ	Project based workshop to prepare different models with the aid of workshop trades i.e., Carpentry, Tin smithy, House wiring and Fitting			2							2	-	1
				T	COI	Examine water quality and select appropriate purification technique for intended problem		_									ь.	↦
					CO2	Predict potential complications from combining various chemicals or metals in an engineering setting		_	_									
	8	15CY100 1	ENGINEERING CHEMISTRY	4	CO3	Discuss fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena			1									
				T	CO4 /e	Apply phase rule, polymers, conducting polymers and nano chemistry to engineering processes			1									
					CO5 A	An ability to analyze & generate experimental skills			1							-		



Course	•				And in Section 6 is not as a second or section of the second	Targetti particulari	-				and the same of the same			-		1
S No Code	Course Title	Credits	CONO	Description of the Course Outcome	2	_	Prog	Program Outcomes	1 teor	× S				2	PSOS	2 2
			CO1	Understand and apply the fundamentals of a measurement system, characteristics, transducers and metrology using simulation and		-+		-					=		-	1.
			COS	Understand darious electrical & computer parameters, and apply different	J	٠									_	1
o ISGN10	0 MEASHBMENTS	.	COZ	measuring techniques on various electrical parameters using simulation and experimentation tools.	2	2										
03	MEASONMENTS	,	СОЗ	Understand electronic & electro-physiological parameters, and apply measuring techniques on electronic parameters using simulation and	2	2										- 1
				experimentation tools.												1
			CO4	Understand and apply different measuring techniques on civil and mechanical parameters using simulation and experimentation tools.	2	2										
			COI	Apply the fundamental principle of counting and use them to measure the uncertainty in random experiments.	2											+
——————————————————————————————————————	LOGIC AND	J	C02	Apply Venn diagrams to find the conclusion of statements, solve puzzles using binary logic and problems relating to cubes.	2											-
1204	REASONING	1	СОЗ	Apply the available models for Data sufficiency & redundancy and interpret it, when given, in tabular and graphical forms.	2											1
			CO4	Apply the Reasoning techniques to solve problems on arrangements, series, analogies, coding and decoding.	2											1
			C01	Understand the significance of cooling curves and phase diagrams.	1										н	1
			C02	Ability to understand various heat treatment processes.											1	i .
11 16ME21	METALLURGY	4	СОЗ	Identify fuels and furnaces used in metallurgical industries and to Understand the mineral processing basic principles.	1						-		-		ь	1 "
			C04	Acquires knowledge on extraction of metals, production of components using powder metallurgy technique.	-				-			+	-	-	-	<u> →</u>
			CO5 Identify and differentia	Identify and differentiate various types of materialsand understand various	-		_			_						-



Apply the medical consept to the detail
Apply the theoretical concents to conduct various experiments of strength of
Design columns and pressure vessels
Analyze deflections and stresses in beams
Analyze shear force and bending moment diagrams
Analyze stresses in members with ID axial loading or torsion
Plan and conduct simple experiments to demonstrate thermodynamic principles.
Apply principles of combustion for gravimetric and volumetric analysis of fuels.
Apply second law of thermodynamics and principle of entropy to Engineering Devices.
Apply first law of thermodynamics to various flow and non-flow processes
Understand the fundamentals of thermodynamic systems and processes.
Identify different mathematical problems and reformulate them in a is appropriate for numerical treatment.
Test for means-single and two sample means
Apply continuous distributions to suitable real- world situations and analyze bivariate data using correlation and regression analysis.
Apply the conditional probability and discrete distributions to suitable realworld situations.
Description of the Course Outcome



		STANTEL THEOLOGY IN				TORANGA	=			I KABI I MABI	118/1 FIRST #1	Na Caste Course Little
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	Understand the principles of refrigeration and psychronistry	िप्रवीत्तवाह सेव्ह कुलक्षमाम्बान्ह में बोहबत्त धारीताहब बाजे ज्यानेहाब्हर	Understand the working principles of steam generators and steam nordes	Understand the projective of pure arbetance and evaluate the Kanking eyele afficiency for regenerative and binary vapor power cycles	Understand and watmate the boats in various metal forming processes	Understand the theory of metal forming in aliaping of components	Understand and estimate the seconomics of machining various processes	Understand the theoretical background of metal cutting	Compute Fourier transforms using integrals and sides differential equations	Apply Laplace transform techniques to solve differential equations	Depresent analytic functions so by laying blocking and harmon somes expansions and compute real and complex integrals using the Besteling themselven. Also transform complex functions using billingar transformation.	Description of the Course Outcome
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	Code	Course Title	Credits	CONO	Description of the Course Outcome				Pro	Program Outcomes	Outco	mes				_	PSOs	7.0
				COI	Understand different types of fasteners and draft various types of joints, locking arrangements.	2	2	ω	2 3	6	7	000	9	5	=	12	1 -	1 2
21	16ME22	MACHINE	2	CO2	Understand and draft various types of couplings and their arrangements and model the same using Solid works	2			2								<u> </u>	- 1
	0	URAWING		СОЗ	Prepare the assembly drawing of engine parts, machine Components both in conventional form and then by using software.	2			2								-	
				CO4	Generate detail drawings of individual parts of an assembled machine Component both in conventional form and then by using software.	2			2								1	
			•	CO1	Understand basics of DC circuit analysis, fundamentals of AC and introduction three phase circuits	_	2											
		BASICS OF		CO2	Understand construction & working principle of DC Machines	-	2											
22	15EE220 2	ELECTRICAL & ELECTRONICS	4	СОЗ	Understand construction & working principle of Transformer, three phase and single phase induction motor.	-	2											l 1
		ENGINEEXING		CO4	Understand number systems and their conversions, characteristics of PN junction diode	1	2											ł
				CO5	Conduct an experiment to analyze the performance of various electrical and electronic devices and draw their char characteristics.	2	2											1
				COI	Apply the various strategies of presentation Skills.									ω				1
	5 EX	PROFESSIONAL		C02	Analyze the given topics and situations and applying the strategies of group discussion.									ω				
23	2103	ON SKILLS	2	CO3	Analyze the basic concepts of critical and analytical reading skills.							_		w				
				CO4	Apply the strategies of sentence formation and sentence completion.									W				



		26					25				1	24			SNo
		16ME 3115					16ME 3114				6	15EN320		Code	Code
		DYNAMICS OF MACHINES					GAS POWER SYSTEMS				ON SKILLS	CORPORATE			Course Title
		4					4					2			Credits
CO5	CO4	СОЗ	CO2	C01	CO5	CO4	CO3	CO2	COI	CO4	CO3	CO2	COI		CONO
Apply the theoretical concepts to mechanisms by using the simulation software and analyzing the data	Analyzethe gyroscope and governor mechanisms for controlling the moving vehicles	Understand the free and forced vibrations of single degree freedom systems	Analyze the static and dynamic balancing of rotating as well as reciprocating masses due to unbalanced forces	Analyze the static and dynamic forces of planar mechanisms and flywheels	Conduct experiments on reciprocating and rotary machines.	Understand the operating principles of gas turbine and jet propulsion and evaluate their performance.	Understand the working principle of rotary compressors and evaluate their performance.	Understand the working principles of reciprocating air compressors and evaluate their performance.	Understand thermodynamic relations to ideal and real gas problems.	Acquire knowledge on various employability skills & analyze a situation and develop adaptability.	Analyse the organization of the passage and also analyze the tone, attitude and style of the author.	Analyze various strategies involved in writing an essay and apply various styles in writing.	Analyse the method of identifying synonyms and antonyms and analyze the meaning of a word from the context.		Description of the Course Outcome
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Dr. A. SRINATI
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Code	+	0.00		Description of the Course Outcome	\square	2	3	5	6	7	8	9	10	=	12	- :	2
			C01	Understand the working of standard machine tools such as lathe, milling, drilling, grinding, and allied machines.		_										۲	1
			C02	Understand and principles and design considerations of jigs and fixtures used in various machining operations.		_										ъ	ь
27 16ME 3116	E MACHINE TOOLS AND METROLOGY	4	СОЗ	Understand the procedures to measure the geometrical details of various mechanical elements and assemblies using linear and angular measuring instruments.		_										ь	ь
			CO4	Understand the procedures to measure the surface roughness and roundness of given mechanical components.		-										1	ь
			COS	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								ь	ь
			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.	_											ь	ъ
28 16ME 3117	E COMBUSTION ENGINES	4	СОЗ	Understand fuel supply system and combustion phenomenon in SI and CI Engines.	-											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
			COI	Identify Optimum solutions for various single objective problems using Linear Programming models.												н_	1
			CO2	Identify Optimum Solutions through Transportation and Assignment models		1										1	
29 16ME 3118	OPERATIONS RESEARCH	4	CO3	Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models		-									-	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
			C01	Understand the concept of robotics with respect to their anatomy, classification end effectors.	-					7.				, , , , y o) —	14
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		32					31				30		SNo
		16ME 3221			,	-	16ME 3220				3219		Course
		DESIGN OF MACHINE ELEMENTS					HEAT TRANSFER				ROBOTICS		Course Title
		4					4				w		Credits
COS	CO4	CO3	C02	COI	COS	CO4	CO3	C02	COI	СОЗ	C02		CONO
Analyze machine elements using ANSYS software	Design the appropriate springs such as helical or leaft springs	Design the power transmission elements such as keys, shafts and couplings	Design the appropriate fastening technique	Understand the basics concepts, analyze the different stresses and apply design principles for static and fatigue strength of machine elements	Conduct experiments and demonstrate heat transfer phenomena involving conduction, convection and radiation.	Design of heat exchangers; Understand principles of radiation and evaluate radiative heat transfer between two bodies.	Apply principles of convection, boiling and condensation and evaluate convective heat transfer coefficient for different flow situations.	Analyze steady state conduction problems involving internal heat generation and extended surfaces and one dimensional unsteady state heat conduction problems.	Understand laws of heat transfer and apply Fourier law of conduction for one dimensional heat conduction to engineering problems.	Ability to solve the kinematics for robot manipulator	Analyze a suitable sensors for robotic system design with respect to their applications.		Description of the Course Outcome
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S No	Course	Course Title	Credits	CONO	Description of the Course Outcome				Pro	Program Outcomes	Outco	mes				PSOs	101
				COI	Understand the basic fundamentals of computer aided design and manufacturing.	_		1								1	
				CO2	Explain the basic concepts of NC and CNC programming in machining.											1	
ដ	16ME 3222	INTEGRATED MANUFACTURI	4	СОЗ	Learn the basic concepts of group technology and flexible manufacturing systems.	_										1	
		Z.		CO4	Learn the basic concepts of computer aided process planning.											1	
				COs	Gain hands on experience in converting a given raw material into desired shape and size by applying suitable casting and welding processes.			2								1	
				CO1	Apply various work-study techniques to determine the standard time and efficiency.	2								2		2	
		BBODIOTION		CO2	Analyze various quality control techniques for bringing out the best quality output.	2								2		2	
34	16ME 3223	AND OPERATION	4	СОЗ	Apply various production scheduling techniques to optimize productivity & Forecast the future demand for the product	2								2		2	
		MANAGEMENT		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	
				COI	Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, breakeven, benefit-cost ratio			-						2			
	17 MB	ECONOMICS	· 	CO2	Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions									2			
3		FOR ENGINEERS	×	СО3	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			

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36	16ME 4124		Course Title MECHATRONIC S	creats	CO ₂ CO ₃ CO ₄ CO ₄ CO ₄ CO ₄ CO ₄ CO ₅ CO ₄ CO ₄ CO ₅ CO ₄ CO ₄ CO ₄ CO ₅ CO ₄ CO ₅ CO ₄ CO ₅	Understand the role of sensors and transducers for control systems Apply the concepts of control systems in the field of automation. Acquire ability to analyze and simulate response of a control systems Apply the principles of PLCs in the design of control systems to achieve	2	2 2 4
					CO ₄	Modelling of different systems with the help of control systems concepts and controllers to solve the engineering problems.	2	
					COI	Design and selection of various belt and chain drives	w	
			DESIGN OF		CO2	Design and Selection of the suitable bearing for the given loading condition	3	
37	16ME 4125	TRAN ELE	TRANSMISSION ELEMENTS	4	СОЗ	Analyze kinematic and dynamic aspects in design of brakes, clutches and IC engine components	ω	
					CO4	Design and analysis of different types of gear drives	ω	
					CO5	Analyze machine elements using analysis software		
					CO1	Understand the importance of Environmental education and conservation of natural resources.		
38	17GN10 01		ECOLOGY AND ENVIRONMENT	2	C02	Understand the importance of ecosystems and biodiversity.		
					CO3	Apply the environmental science knowledge on solid waste management, disaster management and EIA process.		_

Dr. A. SRINATH
PROFESSOR & HEAD
Department of Mechanical Engines
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SNo	Course Code	Course Title	Credits	CONO	Description of the Course Outcome	2		4	Pro	Program Outcomes	Oute	omes	9	5	=	12	PSOs	200
				CO1	realize and understand the basic aspiration, harmony in the human being							-						
39	15GN10 02	YALUES VALUES	2	CO2	envisage the roadmap to fulfill the basic aspiration of human beings.							2						
				СОЗ	analyze the profession and his role in this existence.							2						
				COI	Analyze Statically Indeterminate Beams	2	2										2	
	16ME	ADVANCED		CO2	Analyze Curved Beams and Beams subjected to Unsymmetrical bending	2	2										2	
40	4051	STRENGTH OF MATERIALS	w	СОЗ	Apply Energy methods to find deflections in simple Structures	2	2										2	
				CO4	Analyze Stresses in Rotating members and Thick cylinders	2	2										2	1
				COI	Analyze 3D stresses & strains for general loading and solving complex engineering problems using approximate methods	2	2		-						†		2	1
	IEME	FINITE		CO2	Analyze 1D structural problems using FEM	2	2		2						 	_	2	1000
41	4052	ELEMENT METHOD	s	СОЗ	Analyze 2D problems including axi-symmetric solids subjected to axi-symmetric loading using FEM	2	2		2	',			-				2	, ,
				CO4	Analyze thermal problems structural dynamic problems using FEM	2	2		2	2		-		-	-	+	+	2
				CO1	Understand the concepts of acoustics and vibrations	2	2			-	+	-		+	+	+	+-	1
		ADVANCED		C02	Determine the sources of vibrations	2	2		-	-	-	+	+	+	+	+	+	1
42	16ME 4053	VIBRATIONS	w		Measure the level of vibration and control the vibrations	2	2	_		+	+	+-	+	-	+	+-	_	1
		CONTROL		CO3				_	_	_		_		_	_	_		-



S	Course	Course Title	Credits	CONO	Description of the Course Outcome				_	Program Outcomes	n Outc	omes					PSOs	S
	Code	-		\rightarrow		-	2	3	4	9	7	œ	6	10	11	12	1	7
				100	Understand the Fundamentals of CAD and display devices	1			_								1	1
	16ME	COMPUTER		C02	Apply the concept of geometric modeling	2			, 1	2							2	2
5	4054	AIDED DESIGN	n	CO3	Able to apply concept of Surface and solid modeling	2				2							2	2
				CO4	Application of various Geometric transformations	2			.,	2							1	1
				100	Understand the types of Maintenance Techniques	-											1	1
;	16ME	CONDITION		CO2	Diagnose fault through Vibration Monitoring	2											1	1
	4055	MONITORING	n	CO3	Interpret the Faults through Thermal Monitoring or Lubricant Analysis	7											1	1
				CO4	Apply sensors for condition monitoring	7											н	1
				COI	Assess the failure of unflawed structural components		2		2								г	г
	16ME	CREEP FATIQUE		CO2	Assess the fatigue life of structural components under the specified load spectrum		2		7								П	н
45	4056	AND FRACTURE MECHANICS	.u	CO3	Evaluate the fracture toughness and assess the life of flawed structural components		2		2								7	2
				CO4	Assess the life of structural components under creep		2		2						_		-1	
				100	Analyze stresses and strains in planes in elastic or plastic region	2	2										2	2
	16MF	THEORY OF		CO2	Solve 2-D problems in rectangular Components	2	2								_	_	-	
46	4057	AND	m	CO3	Analyze stresses and strains in 3-D problems	2	2									-	- 7	7
				CO4	Analyze Beams and frames in plasticity applications	2	2										7	2
				100	Know the composite materials and manufacturing methods	1										-	-	-
	TOME	MECHANICS OF		C02	Understand the behaviour of composite Lamina	1									_	-	-	1
47	4058	COMPOSITE	<i>с</i>	CO3	Know the properties of various types composite materials											-	-	1
			•	CO4	Apply Failure theories to calculate stresses in composite materials	2												2 2
						-	-								_		`	/

Dr. A. SRINATH
PROFESSOR & HEAD
Department of Mechanical Engineers
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To classify and understand the need of Non-Traditional Manufacturing Processes. 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. To understand the working principle and the effect of various process parameters on its performance of various Non-Traditional Welding Processes. To understand the working principle of various Non-Traditional Forming Processes. Ability to identify different types of optimization problems Understand basic concepts in solving nonlinear optimization problems Understand optimality conditions for unconstrained and constrained optimization problems and be able to apply them in verifying the optimality of a solution
hanism of metal removal and the performance of various Non-the effect of various process Non-Traditional Welding rious Non-Traditional Forming ization problems inear optimization problems onstrained and constrained y them in verifying the optimality
1 2 3 4 5 6 7 8 9 10



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S No	Code	Course Title	Credits	CONO	Description of the Course Outcome		Program Outcomes	PSOs
				3		1 2 3	4	1 2
				[0]	Understand the strategies and components of automation in productions.	_		1 1
51	16ME 4064	MANUFACTURE	3	CO2	Analyze the automated flow lines in production systems.			2 2
		NG		CO3	Analyze and design the assembly lines and materials handling systems of production systems.	-		2 2
				CO4	Develop the adoptive system for a machine cell.	1		2 2
				COI	Develop the ability to design cutting tools for given single component.	2		1 1
52	16ME 4065	TOOL ENGINEERING	w	C02	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
				COI	Analyze various production schedules and plant layouts.	-		2 2
 53	16ME N	FLEXIBLE MANUFACTURI	ω	C02 A	Apply the concept of group technology to the development of FMS.	-		2 2
 		THE STOLENIS		CO3	Identify hardware and software components of FMS.	_		1
				CO4 A	Analyze materials handling and storage system in FMS.	1		2 2



~									2	2	-	Analyze cooling load for comfort and industrial air conditioning on basts of processes on psychometric charts and its components.	CO4				
-							+		-	+-	+-	Understanding the working of Cascade systems for low temperature Production and of VAR system.	CO3	· ·	CONDITIONING		36
2										2	2	Analyze the performance of Vapor Compression Refrigeration with modification of cycle and its components.	CO2	,	REFRIGERATIO	16ME	
					-					2	2	Analyze COP of different refrigeration cycles with different methods of refrigeration using different refrigerants.	COI				
-	+-								-	-		Select subsystems for achieving high accuracy in machining.	CO4				
2	- ~					-			_			Design and analyze systems for specified speeds and feeds.	СОЗ	i.	DESIGN	4068	55
2	2							-				Design machine tool structures.	CO2	J.	MACHINE TOOL	I6ME	
-	1	-		-					_			Understand basic motions involved in a machine tool.	COI				
-	-	and the spirit of the spirit o	1			San State of the San St			_			Understand the behavior and applicability of Magnetostrictive materials in designing smart structures and materials.	CO3		AND THE PROPERTY OF THE PROPER	And the second s	
THE STATE OF THE S	-					Name of the second			-			Understand the behavior and applicability of Electro active polymers in designing amount structures and materials.	MACUNITATION AND AND AND AND AND AND AND AND AND AN		MATERIALS	4067	
	-					Papagetal Ministration (Management		-				Understand the behavior and applicability of Shape memory alloys in designing smart structures and materials	('02	-	NMART	I6ME	, -
	The state of the s					Silva and the second	P. d.		-		100 mg (C)	Understand the behavior and applicability of Piezoelectric materials in designing smart structures and materials	(0)				
	- F	112	<u>5</u>	9	30 1	Frogram Outcomes	6 6	1	-	2		Description of the Course Outcome	ONO	Credits	Course Title	Course	Z Z



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SNo	Code	Course Title	Credits	CONO	Description of the Course Outcome	1	2	3	4	N	6	7	000	9 1	10	=	12	-	100
				COI	Understand and analyze various solar thermal applications.	2	2				-		-				-	-	1 1
	16MF	NON-	,	CO2	Analyze the performance of tidal, wave and Ocean thermal energy conversion (OTEC) systems		2		2	-				-	-			2	2
57		ENERGY SOURCES	w	СОЗ	Understand and analyze the operation of wind, geothermal, biomass and biogas power generation.	2	2			-	-		-			-		н	1 4
				CO4	Understand and analyze the operation of solar photovoltaic cells fuel cells and the phenomenon of fusion.	2	2						-		ļ			1	1
				C01	Understand the working of system and subsystems of Hydro Electric and Diesel power plants.	2	2											1	1
	16ME	POWER PLANT	,	C02	Understand the working of system and subsystems of Thermal and nuclear power plants and to draw their layout diagrams	-	_											ы	1
>8	4073	ENGINEERING		СОЗ	Calculate the various factors of power plant economics and understand power generation through Non-conventional energy sources.	2	2											2	1
				CO4	Understand various direct energy conversion systems, pollution and methods to control pollution.	-												н	
				CO1	Understand different types of chassis, engine components, fuel systems and its working principles	1	-											1	
	16MF	AUTOMOBILE		C02	Understand different components of transmission system, cooling and lubrication systems	,1	1											Д	
59	4074	ENGINEERING	<u>.</u>	СОЗ	Understand different components of suspension, steering and braking systems	-	_											н	
				CO4	Understand different electric and electronic systems used in automobiles and pollution control techniques used in SI and CI engines.	-												<u> </u>	



Dr. A. SRINATH
PROFESSOR & HEAD
PROFESSO

Cold Colner Title Credits COND Description of the Courte Outcome Propagation Outcome Propagation	30	PROFES Uepartment of M	Sep 35	5						i	1/000	1	•						
Program Outcomer Program Out	7	~	1					-				w	w	Develop Designs for different applications including thermal management of electronic devices, space applications, power plant heat exchangers and IVAC equipment					
Program Outcome Program Ou	-	-				1	1		 			2	2	Understand design and manufacturing considerations of heat pipes for a given industrial application			DESIGN& APPLICATIONS		8
Property Course Title Covariant Covariant Covariant Covariant Covariant Covariant Covariant Covariant Covariant	-	1										2	2	Understand and interpret the heat pipe operating limits while modeling heat pipes for practical applications			HEAT PIPE: THEORY,	16ME	£
Code Course Title Credits CON Description of the Course Outcome Program	н	-										-	-	Understand the working principle and operational characteristics of heat pipes					
Page Program Outcome Pro	-	1											-	To understand various aspects of the wave phenomena including the normal and oblique shock waves.					
Code Course Title Credits CO NO Description of the Course Outcome Frogram Outcome Program	1	м											7-	To acquire knowledge on the measuring devices and techniques being used in compressible flows.		Г	FLUID FLOW	4077	
Code Course Title Cred Code Pescription of the Course Outcome Total Tota	1	1										2	2	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.		ω Τ	COMPRESSIBLE		62
Code Course Title Credits CO NO Description of the Course Outcome Frogram Outcome Program	μ.	1											1	To understand and apply compressible flow theory in various propulsion devices.					
Code Course Title Const Const	~	ь										2	2	Understand different conversion techniques of Geo-Thermal energy.					
Code Course Title Credits CO NO Description of the Course Outcome Frogram Outcomes PSOs	₽,	1										2	2	stand different conversion techniques of biomass to			TECHNOLOGY	40/6	
Code Course Title Credits CO NO Description of the Course Outcome I 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 1 2 3 4 5 6 7 8 9 10 11 12 1 2 4 5 6 7 8 9 10 11 12 1 4 5 6 7 8 9 10 11 2 1 4 5 6 7 8 9 10 11 2 1 4 5 6 7	1	1										2	2	Understand the principles of OTEC and wind energy and analyze wind speed effects in power generation.		ω T	RENEWABLE ENERGY	16ME	61
Code Course Title Credits CONO Description of the Course Outcome Program Outcomes PSOs Program Outcomes Program Outcomes Program Outcomes Program Outcomes PSOs Program Outcomes Program Outcomes Program Outcomes PSOs PSO	ь	Ľ										2	2	Understand different types of Renewable Energy Sources and Analyzing the energy production.		T			
Code Course Title Credits CO NO Description of the Course Outcome Program Outcomes Program Outcomes PSOs 16ME 4075 ADVANCED MICS CO2 Understanding the concepts of exergy, thermodynamic potential and calculation of exergy of a system 1 2 3 4 5 6 7 8 9 10 11 12 1 16ME THERMODYNA 4075 ADVANCED MICS CO3 Understanding various methods of statistical distribution of particles 1 <td>1</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> <td>Ability to construct figures for particle allocations depending on various probability disrtibutions</td> <td></td> <td></td> <td></td> <td></td> <td></td>	1	1										2		Ability to construct figures for particle allocations depending on various probability disrtibutions					
Code Course Title Credits CO NO Description of the Course Outcome Program Outcomes Program Outcomes PSOS 16ME ADVANCED THERMODYNA CO2 Understanding kinetic theory of gases and intermolecular forces 1 2 3 4 5 6 7 8 9 10 11 12 1	ы												-	Understanding various methods of statistical distribution of particles			MICS	d	
Code Course Title Credits CO NO Description of the Course Outcome Program Outcomes PSOs Local Culation of exergy of a system 1 2 3 4 5 6 7 8 9 10 11 12 1	1											_		Understanding kinetic theory of gases and intermolecular forces		ω	ADVANCED THERMODYNA	16ME	60
Code Course Title Credits CO NO Description of the Course Outcome Program Outcomes PSO	1 1								,				-	Understanding the concepts of exergy, thermodynamic potential and calculation of exergy of a system					
	3	-So	-	-	-	mes	Outco.	ram (Prog	4	3	2		Description of the Course Outcome	CO NO	Credits	Course Title	+	SNO

SNo	Course	Course Title		Credits	CONO	Description of the Course Outcome				Pro	Program Outcomes	Outo	omes					
	Conc				COI	Learn the sensor classification and sensor product selection guide.	1 2	u u	4	S.	6	7	∞	9	10	=		12
64	16ME	AUTOMOTIVE	TIVE —		C02	Analyze the measurement of engine parameter using sensor.			2									
	4081	APPLICATIONS	ONS		СОЗ	Apply required sensors and actuators for automotive applications		2										
					CO4	Analyze the sensors for intelligent transport systems		2										
					C01	Understand the automotive electronics for engine management system	-											
6	16ME	ALITOTRON	Š.		CO2	Analyze required sensors and actuators for an automotive application			2									
9	4082	ACICIRONICS	ICS		CO3	Apply the suitability of a control system for automotive application		2										
					CO4	Ability to analyze of electronic system for automotive applications		2	-									
					C01	Understand the automotive instruments and automotive sensors	1											
	16ME	ELECTRONIC ENGINE			CO2	Learn the measurement of engine parameter by using sensor.			1									
66	4083	MANAGEMENT SYSTEM	NT	ω ————————————————————————————————————	СОЗ	Acquire ability to analyze the electronic fuel injection system				2								
					CO4	Apply the principles of digital control techniques and the application of on board diagnosis			2									
					COI	Understand the knowledge of various Measuring Instruments to design a simple Instrumentation system	1											
	16ME	INSTRUMENTAT ION IN			CO2 /	Analyze the various instruments and use them in various fields				2								
	4084	AUTOMOTIVE INDUSTRIES			CO3 L	Learn and apply the measuring instruments in various industries application			2									
					CO4 A	Analyze suitable instrument for a given application			2									
-			-	-				-		-	-	-			-		Г	\Rightarrow

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	Code	Course Title	Credits	CONO	Description of the Course Outcome	1 3	-		Prop	Program Outcomes	Oute	omes	,	- 1	1 1			S	
				COL	Understand the approach used for mechatronic system design and relevant considerations	- -			v	6	7	œ	٥	10	=	12	1 -		1
68	16ME	MECHATRONIC S SYSTEM	w	CO2	Applythe suitable sensors and actuators used in a Mechatronic system		2										2		2
	4080	DESIGN	(СОЗ	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		
				COI	Understand the concepts of Al	-											н_		1
S	I6ME	ARTIFICIAL INTELLIGENCE	ယ	CO2	Apply basic principles of AI in solutions that require problem solving and planning.			2									2	-	2
	1604	FOR ROBOTICS		СОЗ	Apply basic principles of AI in solutions that require problem solving, planning, reasoning and learning			2										2	2
				CO4	Analyze Al in Robotics		2											2	2
				COI	Understand the design principles of automation and its application in an automated manufacturing system	,-				3.									н
70		AUTOMATION SYSTEM	<u> </u>	CO2	Analyze pneumatic sub-systems of an automated manufacturing system in terms of design, operation and control aspects			2										2	2
	4092	DESIGN	,	СОЗ	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												ш	1
				COI	Understand the concepts industrial automation and measurement systems	-											1	1	1
71		INDUSTRIAL AUTOMATION	 	CO2 /	Apply the controllers in automation		2				, , , , , , , , , , , , , , , , , , ,							2	2
	4093 AI	AND CONTROL		CO3 /	Analyze and select a suitable PLC system for the given application			2										2	
				CO4	Apply the concepts of control systems for industrial automation		2											2	
						- 6	Dr. A. SRINATH PROFESSOR & HEAD artment of Mechanical Enginee DST FIST SPONSORED	Dr. A. POFES: ent of Me	SP SC SP SC SP SC SP	SRINATH SOR & HEA Schanical Eng SPONSOR	SARA	I Z GE		ern /		20			
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		40A2	I AM			40A1	16ME			4								_
						2	<u> </u>			4095	16ME			4094	16ME		Code	Course
		DEVELOPMENT	PRODUCT			DESIGN	AIRCRAFT			HANDLING SYSTEMS	INDUSTRIAL ROBOTICS AND			PNEUMATIC SYSTEMS	INDUSTRIAL HYDRAULIC		Course Title	
		w				u.	,			v				G			Credits)
CQ4		СОЗ	C02	COI	CO4	соз	CO2	COI	CO4	СОЗ	C02	COI	CO4	C03	CO2	COI	CONO	
Determine the cost of product and know the significance to product design	The state of the s	Apply Modelling techniques for a product	Analyze Economics in Design	Understand the principles of creativity in Design	Analyze stresses in Aircraft structures	Select the aircraft materials for manufacturing processes	Determine the forces in Aircraft structures	Understand the Design process of Aircraft	Apply the various applications of robots in material handling	Analyze and select a suitable material handling system for the given application	Learn material handling equipment used both in automated and non-automated systems	Understand the concepts of robot sensors and their applications in robots	Develop circuits for controlling hydraulic and pneumatic using PLC	Analyze required components to develop an automation system using pneumatics and hydraulic system	Analyze diagnose maintenance problems of hydraulic and pneumatic system	Learn the concepts hydraulic or pneumatic actuation system	Description of the Course Concours	
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CO2 Apply kinematic mechanics to analyse Tissues and structural systems 2 CO3 Apply kinematic mechanics to analyse Tissues and structural systems 2 CO4 Apply kinematic mechanics to buman motion 2 CO4 Apply kinematic mechanics to buman motion 2 CO5 Identify appropriate constraints to human motion 2 IOAME MECHATRONIC 3 CO2 Identify appropriate microcontroller for a given application and to build a matchenical Model of system for evaluating open hosp system performance 2 CO3 Suggest an appropriate closed loop control strategy to attain the desired 2 System behavior. CO3 Suggest an Abendancial Model of system for evaluating open hosp system performance 2 CO4 Suggest an Appropriate closed loop control strategy to attain the desired 2 System behavior. CO5 Suggest an Abendancial for a given application and evaluate 2 CO6 Identify appropriate closed loop control strategy to attain the desired 2 CO7 Analyze a satisble sensor for robotic system design with respect to their anatomy. 1 CO8 Analyze a satisble sensor for robotic system design with respect to their anatomy. 1 CO9 Analyze a satisble sensor for robotic system design with respect to their anatomy. 1 CO9 Analyze a satisble sensor for robotic system design with respect to their anatomy. 1 CO9 Analyze a satisble sensor for robotic system design with respect to their anatomy. 1 CO9 Diagnose fault through Vibration Monitoring 1 CO9 Diagnose fault through Vibration Monitoring 2 Interpret the Faults through Thermal Monitoring or Lubricant Analysis 2					I	1	-	2	0	>		2	Apply sensors for condition monitoring	the state of					
16ME BIOMECHANICS 1 CO2 Apply biomechanics to analyse Tissues and structural systems 2 CO3 Analyze joints using Biomechanics theory 2 CO4 Apply biomechanics to analyse Tissues and structural systems 2 CO5 Analyze joints using Biomechanics theory 3 CO5 Identify appropriate enscorateller for a given application. 2 CO5 Inalyze theorem and because of system for a given application and to build a suggest an appropriate closed loop control strategy to attain the desired 2 System behavior. CO5 Suggest an appropriate closed loop control strategy to attain the desired 2 System behavior. CO6 Suggest an appropriate closed loop control strategy to attain the desired 2 System behavior. CO7 Linderstand the concept of robotic system for a given application and evaluate 2 in the propriate closed loop control strategy to attain the desired 2 propriate analyze control system for robotic system design with respect to their 2 2 classification and effectors. CO8 Analyze a suitable sensor for robotic system design with respect to their 2 2 classification and effectors. CO9 Analyze control system for robot control applications 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2						1					ř.	2	or Lubricant Analysis			MONITORING			
16ME BIOMECHANICS 400 CO2 Apply biomechanics to analyse Tissues and structural systems 2 1 2 4 40A3 AND JOINTS 3 CO3 Analyze joints using Biomechanics theory 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				7	7	1					-	2			ω	CONDITION			1,1
16ME HOME OF TISSUES AND JOINTS 16ME HOME AND JOINTS 16ME HECHATRONIC Apply kinematic mechanics to human motion 17 Lightly appropriate sensors and actuation system for a given application and to build a mathematical Model of system for evaluating open loop system performance and behavior. 16ME Suggest a Mechatronic product design for a given application and evaluate its performance. 18 CO1 Understand the concept of robotics with respect to their anatomy, applications. 19 CO2 Analyze a suitable sensor for robotic system design with respect to their 2 applications. 10 CO3 Analyze control system for robot control applications. 10 CO3 Analyze control system for robot applications. 11 CO3 Analyze as unitable sensor for robotic system design with respect to their 2 2 2 3 4 40A5 2 4 40A5 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4											-	-							
16ME HOMECHANICS AND JOINTS 100 CO2 Apply biomechanics to analyse Tissues and structural systems 11 2 3 4 14 CO1 Understand the concepts of Biomechanics 15 CO2 Apply biomechanics to analyse Tissues and structural systems 16 CO2 Apply biomechanics to analyse Tissues and structural systems 17 LONE AND JOINTS 18 CO2 Apply kinematic mechanisms to human motion 29 CO2 Identify appropriate encocontroller for a given application and to build a laderify appropriate princontroller for a given application and to build a laderify appropriate mechanisms to human motion 20 CO2 Identify appropriate mechanisms to human motion 21 CO2 Identify appropriate mechanisms to human motion 22 CO3 System behavior. 23 CO3 System behavior. CO4 Suggest an appropriate closed loop control strategy to attain the desired system performance. CO5 Suggest an Aechartonic product design for a given application and evaluate its performance. CO6 Understand the concept of robotics with respect to their anatomy. 10 CO2 Analyze a suitable sensor for robotic system design with respect to their anatomy. 11 CO3 Analyze control system for robotic system design with respect to their anatomy. 11 CO3 Analyze control system for robotic system design with respect to their anatomy. 12 CO3 CO3 Analyze control system for robotic system design with respect to their									-,-	2			Ability to select the robot configuration for robot applications						
16ME HOMECHANICS AND JOINTS CO2 Apply biomechanics to analyse Tissues and structural systems CO3 Analyze joints using Biomechanics theory CO3 Analyze joints using Biomechanics theory CO4 Apply kinematic mechanisms to human motion CO5 Identify appropriate sensors and actuation system for a given application. CO5 Identify appropriate microcontroller for a given application and to build a mathematical Model of system for evaluating open loop system performance Suggest an appropriate closed loop control strategy to attain the desired system behavior. CO4 Suggest an Alechatronic product design for a given application and evaluate CO5 Understand the concept of robotics with respect to their anatomy. CO6 Analyze a suitable sensor for robotic system design with respect to their ROBOTICS 3 40 CO2 Analyze as uitable sensor for robotic system design with respect to their 2 3 4 CO3 Analyze as uitable sensor for robotic system design with respect to their						I				,,,	2		Analyze control system for robot control				40A3		
COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concepts of Biomechanics COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand the concept of robotics with respect to their anatomy. COIL Understand			1	1		1					2		itable sensor for robotic system design with respect		w	ROBOTICS	16ME	78	
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Code CO1 Understand the concepts of Biomechanics 1 2 3 4 CO2 Apply biomechanics to analyse Tissues and structural systems CO3 Analyze joints using Biomechanics theory CO4 Apply kinematic mechanisms to human motion CO4 Apply kinematic mechanisms to human motion CO5 Identify appropriate sensors and actuation system for a given application. Identify appropriate microcontroller for a given application and to build a and behavior. Identify appropriate microcontroller for evaluating open loop system performance I 2 Identify appropriate microcontroller for a given application and to build a and behavior. I 2 Identify appropriate microcontroller for a given application and to build a and behavior.						1										υ	1021		
1 Code Code									1				Identify appropriate microcontroller for a given application and to build a mathematical Model of system for evaluating open loop system performance and behavior.		ω˙	MECHATRONIC		77	
Code													Identify appropriate sensors and actuation system for a given application.					1	
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щ	ь								-			_		Draw Inflection circle for coupler curves	CO3 D		SIMULATION	5004	8
2	2							-				2	2	Analyze mechanisms in linkages Robotic manipulator	CO2 A		MECHANISMS	16ME 1	S
н	ъ											_	_	Understand Kinematic principles and Structures	COI U				
ь	ь											2	2	Solving N-S equations and Modeling of turbulence	CO4 S	1			
-	1											2	2	Application of time integration methods for convection diffusion	CO3 A	ú	DYNAMICS	5002	
2	2											2	2	Apply different CFD techniques to diffusion	CO2 A	.	COMPUTATION	16ME (S
1	1											2	2	Understand Fundamentals of CFD and Derive the governing equations	CO1 L				
2	2											2		Apply techniques for analysis of unsteady compressible flows.	CO4 A				
2	2							/				2	<i>y</i> ,	Apply techniques for analysis of laminar and turbulent boundary layer flows	CO3 A	<i>ر</i>	COMPRESSIBLE FLOWS		<u>×</u>
2	2											2		Apply techniques for analyzing inviscid incompressible flow problem	CO2	J	INCOMPRESSIB LE AND	16ME	2
ы	1												_	Understand the fundamental concepts of continuum mechanics and shock wave theory	COI				
2	2											1	1	Apply concepts of radiation heat transfer for enclosure analysis	CO4 A				
2	2											2	2	Analyze free and forced convection problems	CO3	·	TRANSFER	5001	00
2	2											2	2	Apply principles of Heat Transfer to develop Mathematical model for ducts and plates	CO2 A		ADVANCED	16ME	ŝ
1	н											-		Understand I-D steady state conduction heat transfer	COI				
2	1 2	12	=	10	9	8	Program Outcomes 5 6 7 8	gram 6	5 Pro	4	3	2	-	Description of the Course Outcome	CONO	Credits	Course Title	Course Code	S No
	Con								1				1						

No	Course Code	Course Title	Credits	CONO	Description of the Course Outcome					Prog	ram (Outco	mes					PSC	Os
				COI	Analyze Stress, strain in a deformable bodies	2	2	3	4	5	6	7	8	9	10	11	12	2	2
84	16ME	ADVANCED		CO2	Apply Energy Methods to calculate deflections in members	1	1											2	2
04	5005	MECHANICS OF SOLIDS	3	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
				COI	Apply various work-study techniques to determine the standard time and efficiency.		2											2	2
85	16ME	INDUSTRIAL ENGINEERING	3	CO2	Analyze various quality control techniques for bringing out the best quality output.		2											2	2
	3126	TECHNIQUES		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
				CO1	Identify Optimum solutions for various single objective problems using Linear Programming models		2											1	1
6	I6ME	OPERATIONS	3	CO2	Identify Optimum Solutions through Transportation and Assignment models		2											1	1
	3118	RESEARCH	,		Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models		2											1	:
				CO4	Solve project management problems using CPM, PERT and Crashing		2											2	
				CO1	Apply various management concepts to solve real life problems		2											2	2
14	6ME E	ENGINEERING	- 1		Analyze various Economic Evaluation of alternatives and Depreciation nethods		2											1	2
		IANAGEMENT	3		analyze various quality control techniques for bringing out the best quality utput.		2												2
				CO4 A	pply various strategies to optimize the Inventory cost		2	-											2
						1									F	3	7	/ Depe	Partn

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S No	Course Code	Course Title	Credits	CO NO	Description of the Course Outcome					Pro	gram	Outc	omes					PS	Os
	0040					1	2	3	4	5	6	7	8	9	10	11	12	1	2
				COI	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
88	16ME	WORK STUDY &	3	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
00	3128	ERGONOMICS		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
				COI	Calculate future demand for the product in the market by applying appropriate forecasting technique.		2											1	1
80	16ME	OPERATIONS		CO2	Apply various plant layout and production scheduling techniques to optimize productivity.		2											2	2
89	3129	MANAGEMENT	3	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

Dr. A. SRINATH

PROFESSOR & HEAD

PROFESSOR STATE OF Mechanical Engineering

Department of Mechanical Engineering

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K.L. University, Vaddeswaram-522 502

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 12th 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 Pluid Mechanics and Hydraulic Machinery as a single course (Annexure !).
 - 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).
 - a. Design
 - b. Thermal
 - c. Manufacturing
 - d. Autotronics
 - e. 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

PROFESSOR & HEAD

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PROFESSOR & HEAD

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K L University <u>Department of Mechanical Engineering</u> <u>Department Academic Committee (DAC)</u>

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

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

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				hanical Engineering	
				mittee Meeting (12/04/2	
	Annexure 1			ch 2016-17 Course Stru	
S.No	Course Name	L-T-P	Cr	Pre-Reg.	Remarks
I		Hı	ımanitic	es & Social Sciences	
ı	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
[]			Ва	asic Sciences	
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
IJ			Engi	neering Sciences	
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
IV		I	Professio	onal Core Courses	
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, Hydraluic 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 measuremest, 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			Profess	ssional Electives	
Design	Specialization				
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 expect system
6	Creep, Fatique 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	NII.	New Course
Manu	facturing Specialization				
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
Therm	al Specialization				
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
Autotr	onics Specialization		ļ		
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
Robot	ics and Automation Specializati	q			
I	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
	VI			OPEN	ELECTIVES	
	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
	VII	PROJECT				
	I	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-Reg.	Remarks				
5	Industrial Robotics and Material Handling Systems	3-0-0	3	NIL	New Course				
VI	OPEN ELECTIVES								
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				
VII	PROJECT								
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				