



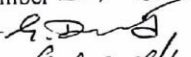






DEPARTMENT OF MECHANICAL ENGINEERING
BOARD OF STUDIES MEETING HELD ON 21.04.2012

Minutes

The following members are present:

1. Prof.K.Shyam Prasad, (Acting Chairman) Member 
2. Prof.K.V.Ramana, Member 
3. Prof.A.Srinath, Member 
4. Prof.B.Raghu Kumar, Member
5. Prof.K.Ramakotaiah, Member
6. Prof.K.J.Babu, Member
7. Prof.Y.V.SSS.V.Prasada Rao, Member
8. Sri.T.V.S.Raghavendra, Member 
9. Sri.G.D.Prasad, Member 
10. Sri.G.Yedukondalu, Member 
11. Sri.K.Babu Raja, Member 

Special Invitees:

1. Prof.J.S.Rao
2. Prof.B.V.A.Rao
3. Prof.K.Ramakrishna 
4. Sri.G.L.Narayana 

Feedback on curriculum by Alumni, Industry peers, Academic Peers and Students on rolls is duly considered while finalizing the syllabus content.

Resolutions:

1. It is resolved to conduct classes for present I Year students in Pro E and Hyperworks for two weeks during Summer Break, as Proposed by Dr.A.Srinath, so as to enable these students undertake the lab components incorporated in Engg. Mechanics.
2. It is agreed to submit content of Lab courses of IV semester, by the end of July 2012.
3. Upon the proposal by Dr.A.Srinath, it is resolved to conduct one Staff Development Program for two weeks on Mechanical Systems, a new course introduced in the IV semester, during August / September 2012. On the same lines a course on Applied Engineering Mathematics is to be organized in association with the department of Mathematics, during the dates convenient to both the departments, at least on month prior to the IV Semester class work commencement.
4. It is resolved to:
 - a) Include Von MISES Stresses in Strength of Materials
 - b) Thermal Stresses along with Composite Cylinders in Strength of materials.
 - c) Analysis of Trusses using method of sections and method of joints in Engg. Mechanics.
 - d) Beam Theory using Classical method in strength of materials.
 - e) Turbulent Flow in place of Boundary layer Theory in Fluid Mechanics.
 - f) Reliability in Probability and Statistics.

ENCLOSURE: APPROVED SYLLABUS



K L UNIVERSITY
Department of Mechanical Engineering
MINUTES OF DEPARTMENT ACADEMIC COMMITTEE MEETING

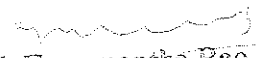
The department academic committee meeting was conducted in HOD, Mechanical Engineering, chamber on 2nd November 2012 at 12:20 pm

The following members were present:

- | | |
|---------------------------------|---|
| 1. Dr. Y V Hanumantha Rao | Head of the Department |
| 2. Dr. K. V. Ramana | Principal, Academic Staff College. |
| 3. Dr. K. L. Narayana | Dean, R & D |
| 4. Dr. A. Srinath | Robotics & Mechatronics Research Group Head |
| 5. Mr. G L Narayana | Thermal Research Group Head |
| 6. Mr. DVA Ramasastry | Design Research Group Head |
| 7. Dr. K. G. Sudhakar | Production Research Group Head |
| 8. V. Sai Ram(12207004) | M.Tech. Thermal Engineering student |
| 9. G.Sai Hemath(09101138) | IV/IV B.Tech Student |
| 10. A. S. N Sai Teja(09101233) | IV/IV B.Tech Student |
| 11. M. Satya Sri (09101324) | IV/IV B.Tech Student |
| 12. M.Karthik Reddy (10101748) | III/IV B.Tech Student |
| 13. P.Naveen Varma (10101807) | III/IV B.Tech Student |
| 14. N V S Sai Kasyap (10101878) | III/IV B.Tech Student |
| 15. G.Naga Prasad (11007043) | II/IV B.Tech Student |
| 16. V.Dileep Kumar (11007303) | II/IV B.Tech Student |

The following points were discussed and resolved


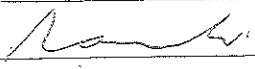
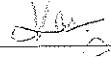
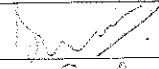
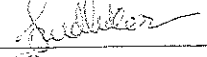

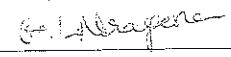
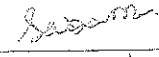
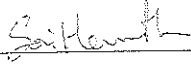
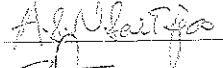
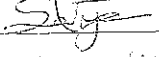
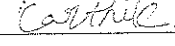

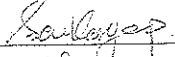
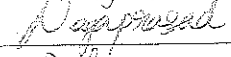
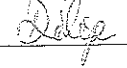
1. Upon feedback from students and Alumni, it is resolved requesting Dr. A. Srinath to verify and propose if any modifications required for the Strength of Materials course.
2. Upon feedback from students and Alumni, it is resolved to request BOS to include topics related to Material Science & Metallurgy in the curriculum.
3. It is resolved requesting Dr. K. G. Sudhakar to verify and propose if any modifications for the Manufacturing Processes – II course.
4. HOD announced that the department is planning to offer three M. Tech courses from the next academic year.
5. HOD requested Dr. K. V. Ramana and Design Group to study the feasibility and propose the structure of M. Tech - Engineering Design by next meeting.
6. HOD requested Mr. G. L. Narayana and Thermal Group to study the feasibility and propose the structure of M. Tech - Thermal Engineering by next meeting.
7. HOD requested Dr. A. Srinath to study the feasibility and propose the structure of M. Tech – Mechatronics by next meeting.
8. HOD further instructed all Research Groups to prepare and come out with syllabi of B.Tech program from 5th Semester to 8th Semester for the admitted batch 2011-12 by next meeting.
9. HOD further instructed all Research Groups to prepare and come out with curriculum with detailed syllabi of B.Tech program for the admitted batch 2013-14 by next meeting.


Dr. Y. V. Hanumantha Rao
Head of the Department

PROFESSOR & HEAD
Department of Mechanical Engineering
DST FIST SPONSORED
K.L. University, Vaddeswaram-522 502

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

The following members attended the meeting on 02/11/2012

S.No	Name of the member	Designation	Signature
1	Dr. Y V Hanumantha Rao	Professor, HOD	
2	Dr. K. V. Ramana	Professor	
3	Dr. K. L. Narayana	Professor	
4	Dr. A. Srinath	Professor	
5	Dr. K. G. Sudhakar	Professor	
6	Mr. DVA Ramasastry	Associate Professor	
7	Mr. G. L. Narayana	Associate Professor	
8	V. Sai Ram	Student	
9	G.Sai Hemath	Student	
10	A. S. N Sai Teja	Student	
11	M. Satya Sri	Student	
12	M.Karthik Reddy	Student	
13	P.Naveen Varma	Student	
14	N V S Sai Kasyap	Student	
15	G.Naga Prasad	Student	
16	V.Dileep Kumar	Student	

K L E F					
Department of Mechanical Engineering					
Department Academic Committee Meeting (23/03/2013)					
Annexure 1: Proposed B.Tech 2013-14 Course Structure					
S.No		L-T-P	Cr	Pre-Req.	Remarks
I HUMANITIES & SOCIAL SCIENCES					
1	English	2-0-2	3	Nil	Nil
2	Language and Reasoning Skills	2-0-2	3	Nil	New Course
3	Ecology and Environment	2-0-0	2	Nil	Nil
4	Human Values	2-0-0	2	Nil	New Course
5	Energy and Society (Audit Course)	2-0-0	Nil	Nil	For this batch this course is as non-credit course, where as for previous batch it was offered as credited course.
6	Employability Skills (Audit Course)	1-0-2	Nil	Nil	New Course
7	Quantitative Aptitude and Reasoning (Audit Course)	0-0-2	Nil	Nil	New Course
8	Advanced Employability Skills (Audit Course)	1-0-2	Nil	Nil	New Course
II BASIC SCIENCES					
1	Linear Algebra and Multivariate Calculus	3-0-2	4	Nil	New Course
2	Differential Equations	3-1-0	4	Nil	New Course
3	Engineering Physics	3-0-2	4	Nil	Nil
4	Engineering Chemistry	3-0-2	4	Nil	Nil
5	Mathematical Methods	3-0-0	3	Nil	Nil
6	Complex Variables and Discrete Mathematics	3-0-0	3	Nil	New Course
III ENGINEERING SCIENCES					
1	Engineering Materials	3-0-0	3	Nil	Nil
2	Measurements	3-0-2	4	Nil	Nil
3	Engineering Graphics with CAD	0-0-4	2	Nil	Nil
4	Workshop Practice	0-0-4	2	Nil	Nil
5	Problem Solving Through Programming	3-0-2	4	Nil	Nil
6	Engineering Mechanics	3-0-2	4	Nil	Topics added: Force systems in space (Vector approach), forces in space-Resultant, Virtual work, Work and energy methods, plane motion. Topics removed: Concepts of stress and strain, Torque

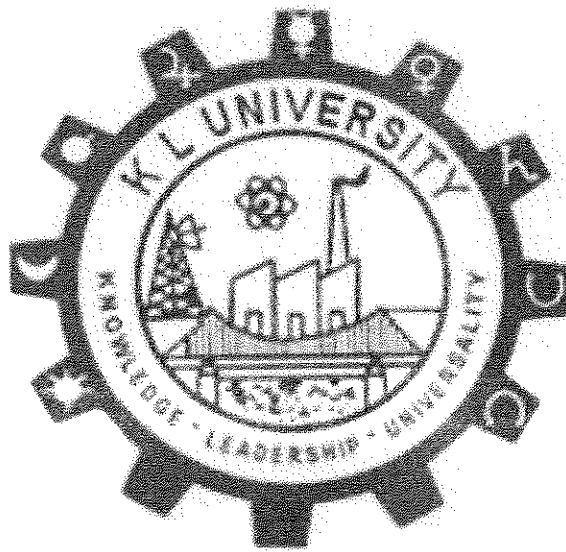
S.No		L-T-P	Cr	Pre-Req.	Remarks
7	Thermodynamics	3-0-0	3	Nil	Nil
8	Object Oriented Programming	3-0-2	4	Nil	New Course
9	Network Theory	3-0-2	4	Nil	New Course
10	Data Structures	3-0-2	4	Nil	New Course
11	Signal Processing	3-0-2	4	Nil	New Course
12	Machine Drawing (Audit Course)	0-0-2	Nil	Nil	New Course
IV	PROFESSIONAL CORE COURSES				
1	Fluid Mechanics & Hydraulic Machines	3-0-2	4	Nil	Topics added: Fluids properties, fluid statics, fluid kinematics, fluid dynamics, flow through pipes, Boundary layer theory
2	Applied Thermodynamics	3-0-2	4	Thermodynamics	Nil
3	Internal Combustion Engines and Gas Turbines	3-0-2	4	Thermodynamics	Nil
4	Heat Transfer	3-0-2	4	FM & HM	Nil
5	Metallurgy	3-0-2	4	Engineering Materials	New Course
6	Manufacturing Processes	3-0-2	4	Engineering Materials	Nil
7	Machine Tool Engineering	3-0-2	4	Nil	New Course
8	Operations Research	3-0-2	4	Nil	Nil
9	Metrology & Instrumentation	3-0-2	4	Nil	New Course
10	Strength of Materials	3-0-2	4	Engineering Mechanics	Topics added: Analyze statically indeterminate beams and thick cylinders
11	Mechanisms and Machine Theory	3-0-2	4	Engineering Mechanics	New Course
12	Finite Element Methods	3-0-2	4	Strength of materials	New Course
13	Mechanical Engineering Design	3-0-2	4	Strength of materials	Nil
14	Machine Design	3-0-2	4	Strength of materials	Nil
15	Industrial Engineering Techniques	3-0-2	4	Nil	Nil
V	PROFESSIONAL ELECTIVES				
Automobile Engineering					
1	Automobile Engineering	3-0-0	3	13ME301	Nil

S.No		L-T-P	Cr	Pre-Req.	Remarks
2	Computer Aided Design	3-0-0	3	13ME205	Nil
3	Vehicle Dynamics	3-0-0	3	13ME206	New Course
4	Automobile Chassis and Body Engineering	3-0-0	3	13ME301	New Course
5	Engine Systems and Performance	3-0-0	3	13ES201	New Course
Flexible Manufacturing Systems					
1	Fatigue, Creep and Fracture	3-0-0	3	13ME205	New Course
2	Flexible Manufacturing Systems	3-0-0	3	13ME302	New Course
3	Modern Manufacturing Processes	3-0-0	3	13ME204	Nil
4	Cellular Manufacturing	3-0-0	3	13ME302	New Course
5	Computer Integrated Manufacturing	3-0-0	3	13ME302	Nil
Mechatronics					
1	Mechatronics System and Control	3-0-0	3	NIL	New Course
2	Modelling and Simulation of Mechatronic Systems	3-0-0	3	NIL	New Course
3	Signal Processing in Mechatronic Systems	3-0-0	3	13ES205	New Course
4	Fuzzy Sets and Artificial Intelligence	3-0-0	3	NIL	New Course
5	Engineering Smart Materials for Mechatronic Applications	3-0-0	3	13ME203	New Course
General Electives					
1	Refrigeration and Air Conditioning	3-0-0	3	13ES201	Nil
2	Advanced Strength of Materials	3-0-0	3	13ME205	Nil
3	Power Plant Engineering	3-0-0	3	13ME202	Nil
4	Computational Fluid Dynamics	3-0-0	3	Nil	Nil
5	Vibrations Engineering	3-0-0	3	13ES106	Nil
6	Operations Management	3-0-0	3	NIL	Nil
VI	OPEN ELECTIVES				
1	Mechatronics	3-0-0	3	NIL	Nil
2	Robotics	3-0-0	3	NIL	Topics added: Industrial automation and control systems
VII	PROJECT				
1	Industrial Training		2	NIL	Nil
2	Term Paper		2	NIL	Nil
3	Minor Project		2	NIL	New Course
4	Practice School/Project Work		12	NIL	Nil

K L E F						
Department of Mechanical Engineering						
Department Academic Committee Meeting (23/03/2013)						
Annexure 2: Proposed M.Tech-Thermal Engineering 2013-14 Course Structure						
S.No	Course Title	Course Category	L-T-P	Credits	Pre-Requisite	Remarks
1	Numerical Methods in Thermal Engineering	Core	3-1-0	4	Nil	New course
2	Advanced Thermodynamics	Core	3-1-0	4	Nil	Topics removed: Conjugate fluxes and forces, Entropy production, onsagers reciprocity relations, thermo electric phenomena and formulations. Thermodynamics of high gas flow.
3	Design of Thermal Systems	Core	3-1-0	4	Nil	Topics removed: Optimization methods, optimization of thermal systems, practical aspects in optimal design.
4	Advanced Heat & Mass Transfer	Core	3-1-0	4	Nil	New course
5	Incompressible and Compressible Flows	Core	3-1-0	4	Nil	New course
6	Computational Fluid Dynamics	Core	3-1-0	4	Nil	New course
7	Refrigeration and Cryogenics	Core	3-1-0	4	Nil	New course
8	Measurements in Thermal Engineering	Core	3-1-0	4	Nil	New course
9	Heat Exchanger Design	Elective 1	3-0-0	3	Nil	Topics added: Corrosion, material selection and fabrication. Quality control and quality assurance and non-destructive testing, Heat exchanger fabrication.
10	Convection and Two Phase Flow		3-0-0	3	Nil	Nil
11	Compact Heat Exchangers		3-0-0	3	Nil	Nil
12	Engine Systems and Performance		3-0-0	3	Nil	Nil

S.No	Course Title	Course Category	L-T-P	Credits	Pre-Requisite	Remarks
13	IC Engine Combustion and Pollution	Elective 2	3-0-0	3	Nil	Topics added: Thermal reactors and catalytic converters Topics removed: Methods of super charging and super charges, Advanced theory of carburetion, variable compression
14	Alternative Fuels		3-0-0	3	Nil	Nil
15	Principles of Turbomachinery	Elective 3	3-0-0	3	Nil	Nil
16	Gas Turbine Engineering		3-0-0	3	Nil	Topics added: Thermodynamics of cogeneration, turbo expander. Topics removed: Jet Propulsions, classification and comparison of ram jets, turbo jets, pulse jets and rockets
17	Turbo Compressors		3-0-0	3	Nil	Nil
18	Energy Conservation, Management and Audit	Elective 4	3-0-0	3	Nil	Nil
19	Renewable Energy Technology		3-0-0	3	Nil	Topics added: Applications of renewable energy sources. Topics removed: Hot water system, extraction of thermal energy and application of solar ponds, Bio-gas: design and construction features.
20	Solar Energy and Wind Energy		3-0-0	3	Nil	Nil
21	Seminar		0-0-4	2	Nil	Nil
22	Term Paper		0-0-4	2	Nil	Nil
23	Project			36	Nil	Nil

K L UNIVERSITY
Department of Mechanical Engineering



Annexure 3: PROGRAM DESIGN DOCUMENT

Master of Technology
in
MECHATRONICS

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Executive Summary

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3.2 Program Structure

3.3 Requirement for thesis, internship or other capstone experience

3.4 Any unique features such as interdepartmental cooperation

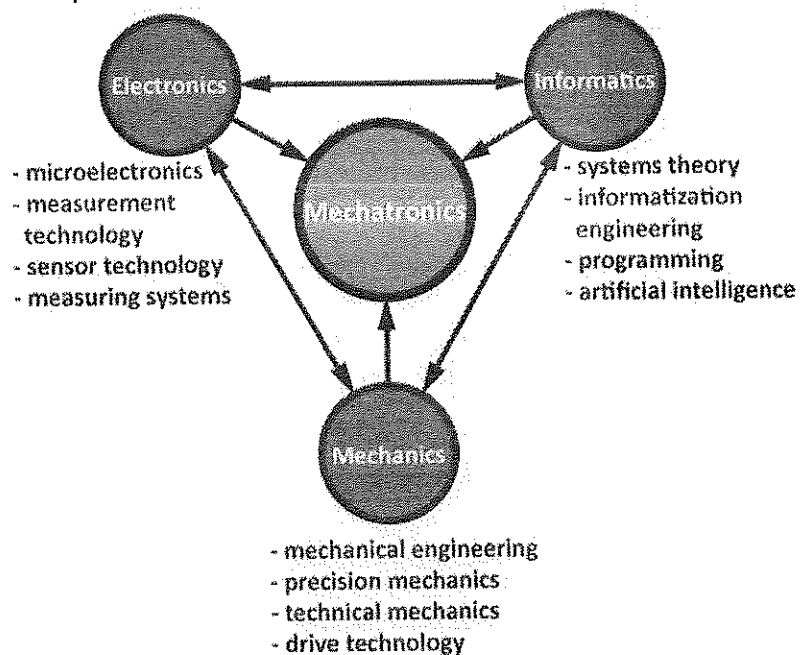
Executive Summary

Mechatronics is a synergistic combination of precision engineering, electronic control and mechanic systems. It is the science that exists at the interface among the other five disciplines:

- Mechanics
- Electronics
- Informatics
- Automation
- Robotics

Mechatronics engineering may be regarded as a modern approach to automation techniques for the broadly defined needs of engineering and education.

It can be assumed that mechatronics is an interdisciplinary field of science and technology, dealing with general problems of mechanics, electronics and informatics.



However, it contains too many related mechatronics areas that form the foundation of mechatronics and cover many well-known disciplines such as electrical engineering, power electronics, digital technology, microprocessor technology, and other techniques. Mechatronics engineering provides an opportunity, not only humanization of machines, but also it changes the mindset and the approach to technological issues and most importantly teaching new technologies and ways of acquiring knowledge and skills. The most important feature of mechatronic devices is the ability to process and communicate information accurately in a form of different types of signals (mechanical, electrical, hydraulic, pneumatic, optical, chemical, biological), with high level of automation of these devices.

1. INTRODUCTION

1.1 Scope of the Course

The course aims to produce students who can design and develop smart machines and use their multidisciplinary skills to meet growing demands of an industry.

Mechatronics Engineering is offered with an integrated curriculum to provide a broad-based education in the basic principles of electrical, electronics, mechanical, control, instrumentation and computer engineering. Broad range of topic covered include: Analog and Digital system Design, Signal Processing, PLC Programming, Control Systems.

1.2 Application in Industry Sectors

Mechatronics is a multidisciplinary field of engineering with far reaching applications on various sectors of the society. Mechatronics plays a key role in the development of tomorrow's products by being at the forefront of cutting-edge designs. Today, Mechatronics Engineering has gained much recognition and importance in the industrial world and has become an engineering discipline on high demand. Mechatronics may be viewed as a modern mechanical engineering design in the sense that it is the synergistic integration of mechanical engineering with electronics and intelligent computer control in the design and manufacturing that aims at improving and/or optimizing its functionality.

1.3 Career Paths of the Students

In a world being continually transformed by technologies, the field of mechatronics presents diverse employment opportunities in local, national and global organizations. Mechatronics Engineering graduates can select from a wide spectrum of industries for career choices and can also contribute in a variety of roles including design engineer, software engineer, project planner, product designer, and project manager.

Being an integrated course, Mechatronics has a wide spectrum of possibilities for further studies. Post Graduates may pursue their research in varied fields such as Robotics, Automation, Aviation, Aerospace, Controls, Manufacturing, Embedded Systems, Communication, Energy. . The options are endless.

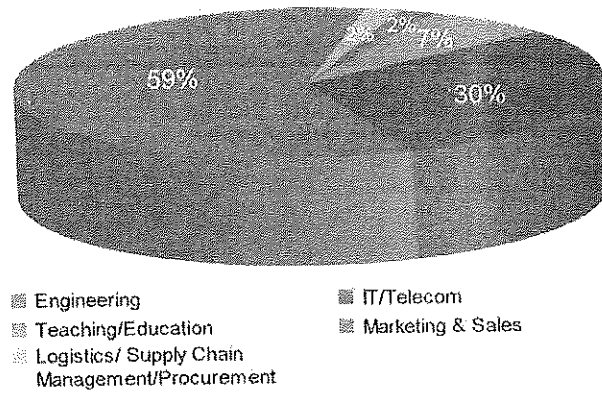


Fig. 1: Top 5 industries hiring mechatronic professionals (Data Courtesy: TimesJobs.com)

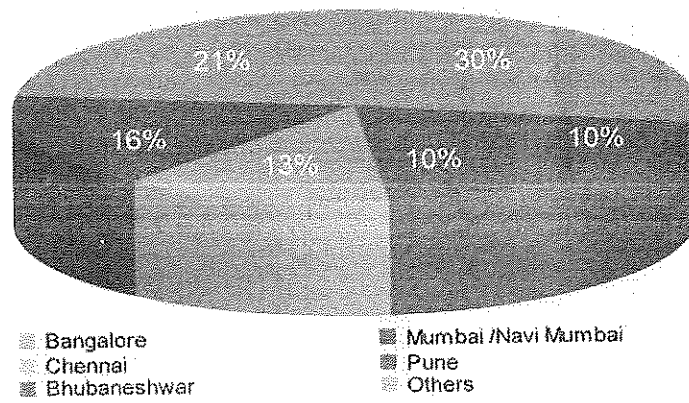


Fig. 2: Top 5 geographical locations hiring mechatronic professionals (Data Courtesy: TimesJobs.com)

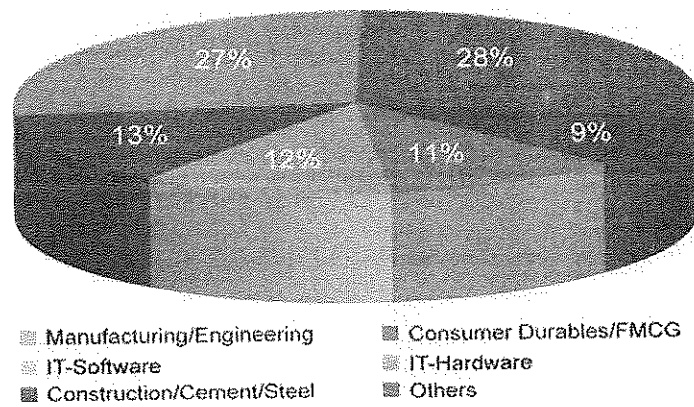


Fig. 3: Verticals where mechatronic professionals are hired (Data Courtesy: TimesJobs.com)

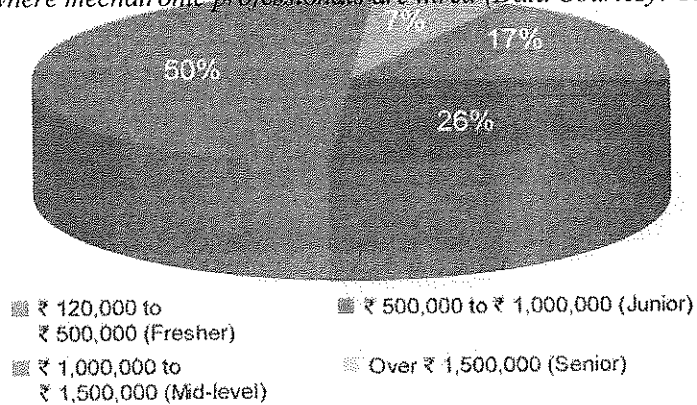


Fig. 4: Pay package (Data Courtesy: TimesJobs.com)

To design and develop products in the mechatronics domain in India, 27 per cent engineers are hired by the engineering/manufacturing sector as per TimesJobs' statistics. Thirteen per cent work in the consumer durable/FMCG sector, 12 per cent in the software industry, 11 per cent in the hardware industry and 9 per cent in construction/cement/steel industry. Remaining 28 per cent are scattered amongst the other industries.

2. Fit With University Mission and Other Academic Programs

“Mechatronics is a study related to the application of mechanical, electronics and computer science engineering, and the future belongs to this blend of engineering,” believes Sudhir Reddy, managing director, Jay Robotix. He says, “When we look at any industry, the advancements in technology are happening at an extremely faster pace and every innovation involves advancements in either software or hardware. There is tremendous scope for automation in industries, which requires research in these combined sciences. There are terrific career opportunities for students who would like to pursue a career in this direction. We cannot predict how advanced the technology will be five years from now, but we can confidently predict that the team that designs it will include computer programmers and electronic embedded systems experts.”

“There is a lot of scope in the mechatronics sector,” believes Dr S.K. Saha, Naren Gupta chair professor, Department of Mechanical Engineering, IIT Delhi. He says, “Today almost everything we use in our daily life, like mobile phone (it has a motor for vibration and of course other electronic items inside to show the display, communicate with other users, etc), washing machine, motor car, etc, is a combination of mechanical and electrical/electronic items. Hence, the knowledge in that area is a must in case somebody wants to work in companies which

manufacture them.” Almost every engineering college today, including the IITs and NITs, offer mechatronics in their UG/PG programme.

Talking about the scope at his organisation, Sudhir Reddy shares, “Majority of the freshers at Jay Robotix are required to work on areas such as embedded systems engineering roles, mechanical design roles, software programmer roles, design engineers roles and other electronics engineering roles. We recruit interns with practical attitude and offer roles which will help them realise their potential strengths. The student will be given a permanent role based on the performance. We believe in making it interesting for the students/graduates while on the job.”

TABLE I
Job Responsibilities, Skills and Qualifications of a Research Engineer

Typical Job Responsibilities	Typical Skills Expected	Qualifications Expected
<ol style="list-style-type: none"> 1. Develop concept in 3D and conduct FEA for optimising the design 2. Selection of sensors for various applications 3. Mechanical-electronic interface knowledge 4. Good knowledge in servo/stepper selection and motion controllers 5. Component and system-level knowledge in reliability testing 6. Ability to develop modules or technology concepts that involve electro-mechanical systems, interfacing with other signal-processing modules 7. Programming knowledge 8. Systems engineering with ability to understand and design performance characteristics of sub-systems/sub-assemblies, their interdependence and their influence on overall system performance 	<ol style="list-style-type: none"> 1. Strong in solid mechanics, mechatronics 2. Knowledge in 3D, preferably SolidWorks, Cosmos/Ansys, etc 3. Good knowledge in sensors and their applications 4. Ability to work in global environment 5. Self starter with good interpersonal and networking skills 6. Focus on quality and result orientation 7. Optimistic, can-do attitude 8. Excellent verbal and written communication skills 	<ol style="list-style-type: none"> 1. Masters in mechanical/mechatronics with 0-2 years of experience in mechatronics systems development 2. Excellent technical knowledge and competence to handle the responsibilities listed 3. Ability to learn and keep abreast of related emerging technologies 4. Strong execution skills and innovation mindset

TABLE II
Job Responsibilities, Skills and Qualifications of an Assistant Maintenance/Service Engineer

Typical Job Responsibilities	Typical Skills Expected	Qualifications Expected
<ol style="list-style-type: none"> 1. Perform preventive maintenance of filling and packaging lines 2. Conduct customer training 3. Troubleshooting and customer support 4. Installation and commissioning of filling machines/distribution systems 5. Travel in the region and abroad (for training and customer support) 	<ol style="list-style-type: none"> 1. Experience and knowledge of packaging and wrapping technology would be an advantage 2. Knowledge or experience of food processing technology/industry would be an advantage 3. Knowledge of PLC programming and electrical troubleshooting would be an advantage 4. Analytical and problem-solving skills 5. Result oriented 6. Team player 7. A detail-oriented and methodical individual 8. Ability to work under pressure for longer duration 9. Willingness for extensive travel (20-25 days per month) 	<ol style="list-style-type: none"> 1. Diploma/degree in mechatronics (preferably)/ electronics/electrical 2. 2-4 years of industrial experience in capital equipment maintenance post degree/diploma

TABLE III
Job Responsibilities, Skills and Qualifications of a Design Engineer

Typical Job Responsibilities	Typical Skills Expected	Qualifications Expected
<ol style="list-style-type: none"> 1. Responsibilities include development of algorithms and real-time software in close consideration of object dynamics 2. Management of software releases 3. Troubleshooting system issues related to motion control 4. Work in close cooperation with mechanical group to participate in process of component selection 5. Writing specifications 6. Assisting in writing documentation 	<ol style="list-style-type: none"> 1. Familiarity with semiconductor industry 2. Experience in development of motion control application using proprietary development environments like MFC and Delta Tau 3. Knowledge in area of real-time systems, mechatronics, robotics, symbolic computations and motion controllers 4. MATLAB/Simulink <p>Communication:</p> <ol style="list-style-type: none"> 1. Excellent written, verbal and presentation skills 2. Ability to clearly communicate his/her idea, write white papers and present to large audience 3. A self-motivated, independent contributor who can work with minimum supervision 4. Previous experience in development of complex system in team environment 	<ol style="list-style-type: none"> 1. BE/B.Tech in any discipline or mechatronics and ME in mechatronics is must

3. Program Characteristics

3.1 Program Outcomes

- a. Advanced knowledge of a broad range of modelling methodologies, and underlying mechanical science, commonly used in the development and analysis of mechatronic engineering systems.
- b. Knowledge of fundamental design issues relevant to mechatronic engineering, and an understanding of how to formulate and analyse design solutions in various engineering contexts.
- c. Working knowledge of a range of modern mathematical methods and tools used in the development and analysis of mechatronic engineering systems.
- d. In-depth knowledge of one or more of the following (depending of selection of option modules and project area): specific engineering systems, design methods, modelling techniques, mathematical and/or numerical techniques.
- e. Knowledge of basic research and development principles and practices relevant to mainstream engineering industry.
- f. Knowledge of key professional, safety and ethical issues arising in modern engineering industry.
- g. Knowledge of time-management and work planning issues related to the organisation, implementation and successful completion, including reporting, of an individual, Masters level, engineering based project.

3.2 PROGRAM STRUCTURE

3.2.1 Total credits required for post-graduation: 90

3.2.2 Distribution of Courses Semester wise:

S No	Course code	SEMESTER – I	L	T	P	Cr
1.		Core Course - 1				
2.		Core Course - 2				
3.		Core Course - 3				
4.		Core Course - 4				
5.		ELECTIVE-I	3	0	0	3
6.		ELECTIVE-II	3	0	0	3
7.		Seminar	0	0	4	2
		TOTAL Credits:				24-26

S No	Course code	SEMESTER – II	L	T	P	Cr
1.		Core Course - 5				
2.		Core Course - 6				
3.		Core Course - 7				
4.		Core Course - 8				
5.		ELECTIVE-III	3	0	0	3
6.		ELECTIVE-IV	3	0	0	3
7.		Term Paper	0	0	4	2
		TOTAL Credits:				24-26

S.No	Course Code	Second Year	Credits
1		Dissertation	36
		TOTAL Credits:	85-90

3.3 Requirement for thesis, internship or other capstone experience:

Each student should do project work and has to submit thesis.

3.4 Any unique features such as interdepartmental cooperation:

This program is to be offered for B.Tech Graduates in Mechanical or Electronics and Communication or Electrical and Electronics Engineering.

K L E F

Department of Mechanical Engineering

Department Academic Committee Meeting (23/03/2013)

Annexure 4: Proposed M.Tech Mechatronics 2013-14 Course Structure

S.No	Course Title	Course Category	L-T-P	Credits	Pre-Requisite
1	Fundamentals of Mechatronics	Core	3-0-0	3	Nil
2	Advanced Engineering Mathematics	Core	3-1-0	4	Nil
3	Sensors and Actuators	Core	3-0-0	3	Nil
4	Modeling and Simulation of Mechatronic Systems	Core	3-1-0	4	Nil
5	Mechatronics Lab-I	Core	0-0-4	2	Nil
6	Robotics: Advanced Concepts and Analysis	Core	3-2-0	4	Nil
7	Control of Mechatronic Systems	Core	3-2-0	4	Nil
8	Mechatronics Product Design	Core	3-2-0	4	Nil
9	Precision Engineering	Core	3-2-0	4	Nil
10	Mechatronics Lab-II	Core	0-0-4	2	Nil
11	Signal Processing in Mechatronic Systems	Elective 1	3-0-0		
12	MEMS & NEMS		3-0-0	3	Nil
13	Vehicle Dynamics and Multi-body Systems		3-0-0		

S.No	Course Title	Course Category	L-T-P	Credits	Pre-Requisite
14	Emerging Smart Materials for Mechatronics Applications	Elective 2			
15	Intelligent Visual Surveillance				
16	Microprocessors and Embedded Systems		3-0-0	3	Nil
17	Computational Fluid Dynamics	Elective 3			
18	Non Linear Optimization		3-0-0	3	Nil
19	Industrial Automation	Elective 4	3-0-0	3	Nil
20	Fuzzy Sets and Artificial Intelligence				
21	Seminar		0-0-4	2	Nil
22	Term Paper		0-0-4	2	Nil
23	Project			36	Nil