

Indian Institute of Technology Patna

M.Tech (Mechatronics)



Placement Brochure
2016-17

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ABOUT US

M.Tech in Mechatronics is offered by School of Engineering & Technology (Department of Mechanical Engineering jointly with Department of Electrical Engineering), IIT Patna. The program is designed for Mechanical Engineers, Electronics Engineers, Instrumentation Engineers and Electrical Engineers who aspire to become strong contributors to multidisciplinary design and product development teams. Contributing to ground breaking research activities by nurturing the best minds of the country, is one of the key mottos of the program.

In this program, engineers with a solid foundation in the core principles of their complementary discipline gets augmented with focused study in Mechatronics at the intersection of Electrical, Electronics and Mechanical Engineering. Special focus is given on the areas of modeling, simulation, and motion planning for robots interacting with stochastic, dynamic and unstructured environments with respect to applications related to agricultural robotics, socially assistive robotics, underwater robotics and micro-manipulation of biological cells. A significant research work completes the program and facilitates the transfer of new cross-disciplinary knowledge to professional practice. Participants are positioned to drive innovation in technology and product development.

COURSE STRUCTURE

M.Tech in Mechatronics is a two year program

First Year
Specializations and Electives

Second Year
Research and Teaching
Assistantship

Courses Offered

Core Courses

1. Fundamentals of Mechatronics
2. Robotics: Advanced Concepts and Analysis
3. Control of Mechatronic Systems
4. Sensors and Actuators
5. Modeling and Simulation
6. Advanced Engineering Mathematics

Elective Courses

1. Signal Processing in Mechatronics System
2. MEMS & NEMS

Research Work

Students undertake projects pertaining to some real time problems in final year under the guidance of distinguished faculties and complete their thesis as a part of the course.

3. Industrial Automation
4. Structural Dynamics
5. Finite Element Analysis
6. Industrial Automation
7. Machine Learning
8. Artificial Intelligence
9. Aerodynamics
10. Wear and Lubrication for Mechatronic Systems
11. Emerging Smart Materials for Mechatronic Application

LABORATORY FACILITIES

Robotics and Automation Laboratory:

The LAB is well equipped with 4-axis SCARA, 5-axis, 6-axis, Fire Bird XI, humanoid robot etc. This LAB also includes instruments like NI-cDAQ, Bi-axial stretching machine and number of other equipments. Research in this LAB focuses on robotics, elastomer and cryogenic set ups.



Mechatronics, Control and Instrumentation Laboratory:

The LAB is equipped with sensors and actuators, Festo industrial automation (PLC, hydraulics and pneumatics), laser cutting machine, 3D printer, CNC, PCB rapid prototyping etc. Research area includes robotics, bio-robotics, micro –robotics, sensors and actuators.



Instrumentation and Control Laboratory:

The research in this LAB includes control of mechatronics system, feed forward and feedback control, sensors. The LAB is equipped with thermocouple, Strain gauge, LVDT, Photo sensor, Programmable Logic Control Laboratory Controller, Traffic Light Controller, Inverted Pendulum Control, Magnetic Levitation, and Servo Mechanism.



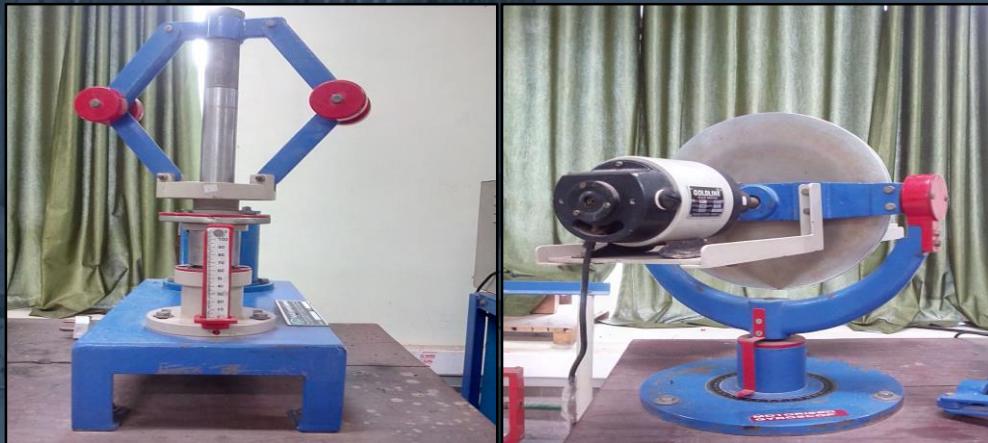
Microprocessor Laboratory:

This lab provides access to different microprocessors and microcontrollers. Students in this LAB have learned basics of programming on Intel 8086 microprocessor and microcontrollers like Arduino, Raspberry pi.



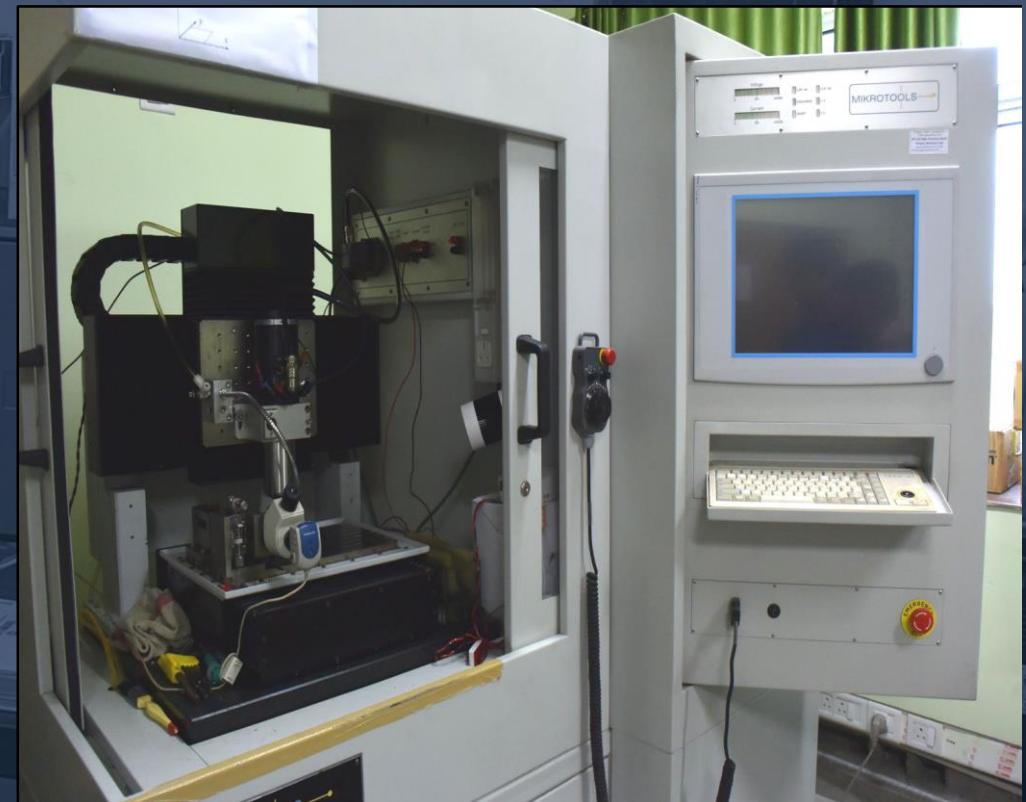
Dynamics Laboratory:

The LAB is equipped with motorized gyroscope, governor, active mass suspension system, machinery fault simulator etc. The research area in this LAB focuses on visco elastic materials, fault simulation in bearings, motor stator and rotor.



Micromachining Laboratory:

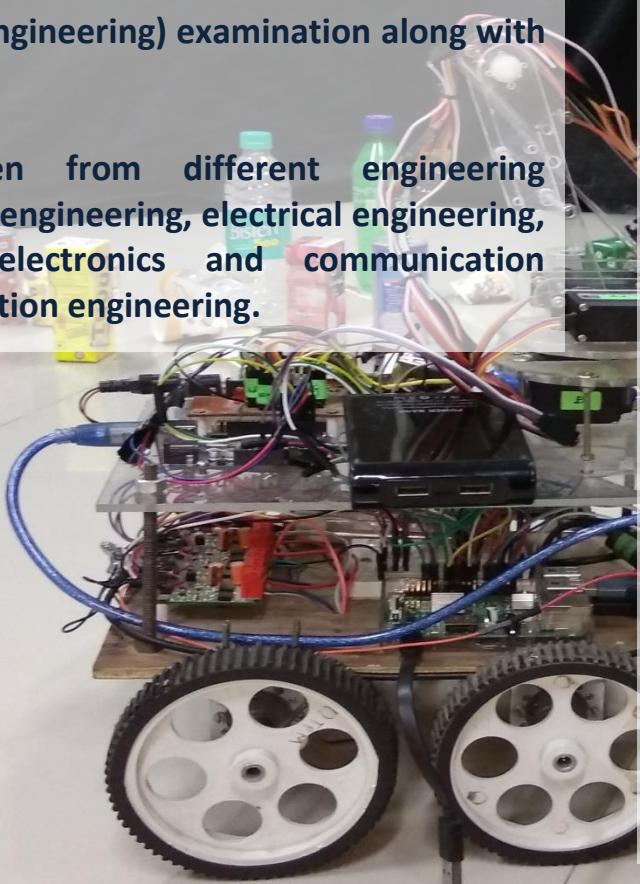
LAB Contains CNC Multi-Purpose Micro Machining Centre capable of carrying out the following types of micro machining process/operation micro-turning, micro-milling, micro-drilling, micro-electrical discharge machining(μ -EDM), micro-wire electrical discharge machining(μ -WEDM), micro-wire electrical discharge machining(μ -WEDG).



STUDENT PROFILE

The admissions to M.Tech in Mechatronics programme is based on the performance of students in the national level GATE (Graduate Aptitude Test in Engineering) examination along with personal interview.

The students are chosen from different engineering backgrounds viz. mechanical engineering, electrical engineering, automobile engineering, electronics and communication engineering and instrumentation engineering.

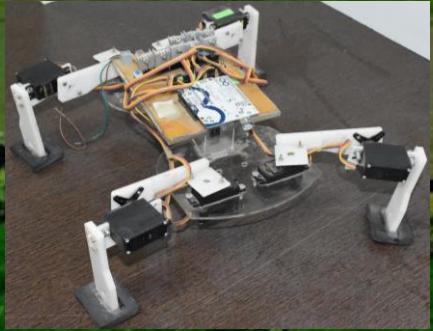
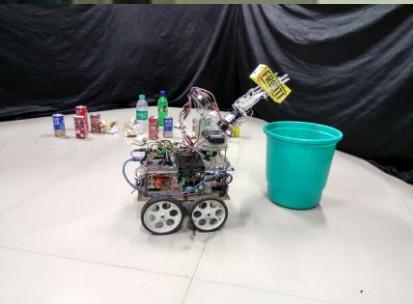


The students are encouraged to take semester wise projects during the first year and M.Tech thesis during their final year under the guidance of professors. The M.Tech thesis is meant for introduction to research work in mechatronics and robotics. This gives to the students an exposure to the real life problems and an opportunity to explore and solve such problems effectively. The students come out with distinct and innovative ideas.

The current batch of students in mechatronics programme has taken up research projects in following areas:

- Shape memory alloy actuated robot
- Energy harvesting using Elastomers
- Cryogenics and micromachining
- Eel inspired robot
- Micro robot for cell manipulation
- Underwater buoyancy controlled robot

RESEARCH ACTIVITIES



Some of the previous works done includes

- **Waste Sorting Mobile Manipulator:**
Developing a mobile manipulator for automated sorting of recyclables in a landfill site. The robot system is equipped with an imaging system, and performs recognition of recyclables using a machine learning algorithm.
- **Image guided automated non-prehensile magnetic micromanipulation of cells :**
Small ferro-magnetic microbot are controlled using magnetic energy which in turn pushes the biological cells to reach the desired goal location. The developed system can be very useful in bio-medical engineering applications like cell sorting, cell manipulation, targeted drug delivery, etc.
- **Dynamic simulator for optimization based automated parameter tuning of a robotic system:**
Developing control parameters for a robot system, that is capable of moving under effects of water currents and negotiating narrow spaces.
- **Multi sensor based intelligent tool condition monitoring in mechanical micro drilling**
- **Energy harvesting using dielectric elastomer**
- **Myoelectric upper limb prostheses**
- **Tool condition monitoring in mechanical micro drilling**
- **Characterization of mechanical and electrical properties of dielectric elastomer for actuator application**
- **Modeling and analysis of micro-drilling process - statistical and mechanistic approaches**
- **Upper limb prostheses with tactile feedback**
- **Fabrication and gait planning of alligator-inspired robot**

SPONSORED PROJECTS



Projects from:

- Department of Science and Technology
- Center for Energy and Environment, Indian Institute of Technology Patna
- DMSRDE, DRDO
- Ministry of Defense
- Science and Engineering Research Board, DST
- BRNS
- Atomic Energy Regulatory Board, DAE
- ISRO
- Aeronautics R&D Board
- Center for Energy and Environment, IIT Patna
- Udyog Mitra, DIC, Bihar Govt.
- TIFAC, DST
- Government of Bihar

MAJOR RECRUITERS

| | | | |
|---------------------|-------------------|------------------------------|--------------------|
| Google | Microsoft IDC | L&T | Tata Motors |
| Indian Navy | Belzabar Software | Finisar, Malaysia | Zusu Numerix |
| Morgan Stanley | Flipkart | TCS | Cognizant |
| Amazon | CISCO | Tricorn Infotech | Epic |
| Hero Motor Corp | DRDO | IBM | Masamb Electronics |
| Samsung Electronics | Bank of America | Amazon Development Pvt. Ltd. | EDU Vision |
| Trident | Siemens Ltd. | Sigmoid Analytics | BPCL |
| Odessa Tech | Resonance | Tranweb Educational | Paytm On97 |

Several students also choose to go for higher studies. Many students from the M.Tech Mechatronics programme have also been selected to visit various international laboratories/institutions/universities under a number of renowned fellowship schemes including DAAD (German), Charpak (French), etc.

CONTACT US

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