



# PLACEMENT BROCHURE

## 2017-2018

### M.TECH MECHATRONICS





# CONTENTS

- 1. About Us**
- 2. Course curriculum**
- 3. Laboratory facilities**
- 4. Student Profile**
- 5. Research and Innovation**
- 6. Workshops and Student activities**
- 7. Our Past Recruiters**
- 8. Contact Us**



# ABOUT US

**M.Tech in Mechatronics** offered by Department of Mechanical Engineering jointly with Electrical Engineering is an interdisciplinary program designed for Mechanical, Electrical, Electronics and Instrumentation Engineers.

**Its distinguishing features includes:**

In depth knowledge of the fundamentals ,design, analysis and operation of Mechatronics systems.

Study dealing with mechanical devices, sensors ,actuators, smart devices, intelligent controllers and computers.

A pedagogy of ‘learning by doing’ experimentation and innovation.

Areas of modelling ,simulation and motion planning of robots interacting with Stochastic, dynamic and unstructured environment are given special focus.



# COURSE CURRICULUM

First Year involves fundamental theory classes and implementation on mini projects

## Courses

- 1.Fundamentals of Mechatronics
- 2.Robotics: Advanced Concepts and Analysis
- 3.Modelling and Simulation
- 4.Sensors and Actuators
- 5.Advanced Engineering Mathematics

## Lab Courses:

- Mechatronics lab 1
- Mechatronics lab 2

## Elective Courses:

- 1.Mobile Robotics
- 2.Intelligent Visual Surveillance Systems
- 3.Finite Element Analysis
- 3.Digital Image Processing
- 4.Artificial Intelligence
- 5.MEMS and NEMS
- 6.Aerodynamics

Second year involves individual research and teaching assistantship

## Research Work

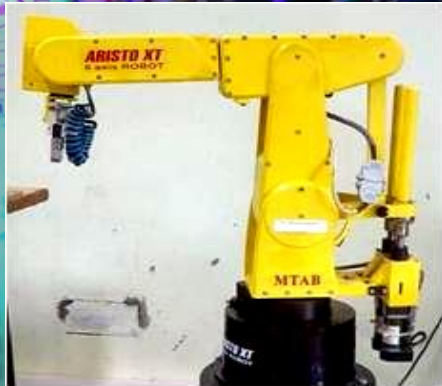
Students undertake projects pertaining to some real time problems in final year under the guidance of distinguished faculties and complete their thesis as a part of the curriculum.



# LABORATORY FACILITIES

## Robotics and Automation Laboratory:

The LAB is well equipped with *SCARA*, *5-axis manipulator*, *6-axis manipulator*, *Fire Bird XI*, *humanoid robot* etc. This LAB also includes instruments like *NI-cDAQ*, *Bi-axial stretching machine* and number of other equipment. Research in this LAB focuses on Robotics, Smart materials and Cryogenic set ups.



## Mechatronics, Control and Instrumentation Laboratory:

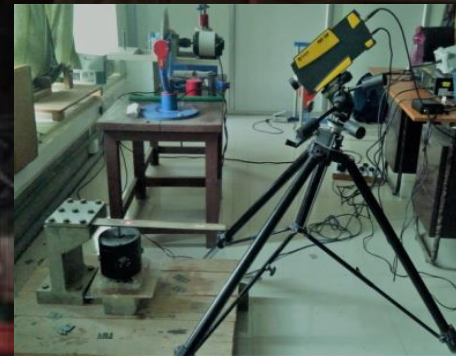
The LAB is equipped with *Festo industrial automation (PLC, hydraulics and pneumatics)*, *laser cutting machine*, *3D printer*, *CNC*, *PCB rapid prototyping* etc. Research area includes robotics, bio-robotics, micro-robotics, sensors and actuators.



# LABORATORY FACILITIES

## Instrumentation and Control Laboratory:

The research in this LAB includes control of Mechatronics System, Feed Forward and Feedback Control, Programmable Logic Control Laboratory Controller, Traffic Light Controller, Inverted Pendulum Control, Magnetic Levitation setup, Servo Mechanism and various Sensors like thermocouple, Strain gauge, LVDT, Photo sensor.



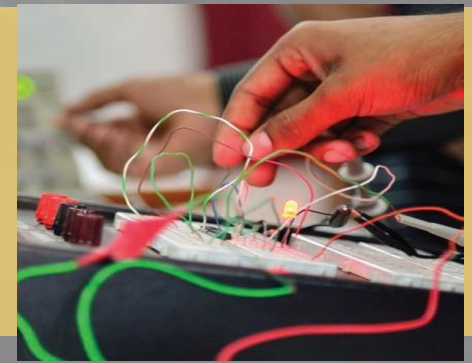
## Dynamics Laboratory:

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.



## Basic Electronics/Analog Laboratory:

This lab is equipped with Digital Storage Oscilloscope, Mixed Signal Digital Laboratory Oscilloscope, Analog & Digital IC Tester, Or CAD PSpice Simulation University Suite, Advanced Digital Electronics Kits.



## Embedded System Integration Lab

This lab is to promote design and development of hardware based system for improving the quality of life. Embedded Systems, IoT and OS supporting tools are being acquired by the lab.



## Digital Signal Processing lab

Digital Signal Processing Lab is equipped with following DSP kits : DM6437 Digital Video Development Platform with Camera , Development to Deployment Code Instrumentation (DDCI) –Interface software , Image and Video Daughter Card Compatible with Texas Instruments 6713/6416, Digital Media Developer's Kit (DM642) With NTSC /PAL Camera.



## 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.





# STUDENT PROFILE

The students are selected on the basis of performance in Graduate Aptitude test in engineering(GATE) along with personal interview from different engineering backgrounds viz. Mechanical Engineering, Electrical Engineering, Automobile Engineering, Electronics and Communication Engineering and Instrumentation Engineering.

Students are encouraged to take semester wise projects during the first year and M.Tech Thesis during their final year. The M.Tech thesis is meant for introduction to research work in Mechatronics and Robotics. This gives exposure to the real life problems and opportunities to explore and solve such problems effectively.

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

- Shape memory alloy actuated mobile robot
- Locomotion and path planning of quadruped robot
- Human action recognition using egocentric camera
- Control of rotor vibration by active damping
- Characterisation of dielectric elastomer actuator and application
- Using IoT for API development using smart sensors
- Artificial skin sensor and glove development for force sensing
- Portable solar tracking mechanism
- ECG signal processing for e-healthcare
- Virtual reality in robotics to enhance haptic feedback





# RESEARCH AND INNOVATION

**Some of the previous work done and ongoing work includes:**

- Balancing robot using accelerometer and Arduino microcontroller.
- Vision based autonomous navigation on firebird XI.
- 3R pick and place manipulator prototype for industrial purpose.
- 4R manipulator design and prototype model.
- Smart security system design using Raspberry pi to send the information in realtime.
- Auto targeting and auto-shooting robot for defence purpose.
- Robust motion Planning of Bio-inspired robot for quadruped autonomous locomotion.
- Hydropower harvesting system using Elastomers smart material.
- Fabrication and gait planning of alligator-inspired robot and the energy management during various gaits.
- Path Planning of carangiform locomotion on SMA based fish robot.
- Characterisation of flex sensor and its application on robotic body for gesture based controlling of the robot.
- A finite element analysis of electro active polymer using Ansys.
- Multi sensor based intelligent tool condition monitoring in mechanical micro drilling.
- Design and fabrication of bio mimic beetle based bot .
- Waste Sorting Mobile Manipulator based on Machine learning algorithm for automated sorting of recyclables in a landfill site.
- Image guided automated non-prehensile magnetic micro-manipulation of cells using magnetic Microbots for efficient drug delivery.



# WORKSHOPS AND STUDENT ACTIVITIES

## IEEE Student Branch

Students of M.Tech,B.Tech and Phd,IIT Patna promotes technical activities in campus ,city and state of Bihar by forming IEEE student branch and organise yearly lectures ,IEEE Programs and conferences.

## Conferences and Workshops

To augment knowledge of students about recent developments conferences and workshops are organised in the institute like IEEE International symposium on 5G,Workshop on IoT application and Technologies, Symposium on Embedded Computing and system design,5<sup>th</sup> national conference on computer vision, pattern recognition and Image processing and Graphics,Virtual Reality.

## Software Training Workshops

A number of timely workshops are organised for the students for providing them exposure and hands-on on the latest software and free license are provided by the institute to the students to accelerate their research. Some of the companies visiting the institute for providing software workshops are:

The logo for MSC Software Adams, featuring the text "MSC Software" in red and "Adams" in a larger, bold red font.The logo for ANSYS, with "ANSYS" in a large, bold, yellow font and a registered trademark symbol.The logo for COMSOL, featuring a blue stylized icon followed by the word "COMSOL" in blue.The logo for Autodesk, featuring a stylized "A" in blue and green followed by the word "AUTODESK" in black.The logo for MathWorks, featuring a stylized "M" in blue and red followed by the word "MathWorks" in blue.The logo for MSC Software Nastran Patran, featuring the text "MSC Software" in red and "Nastran Patran" in a larger, bold red font.The logo for National Instruments, featuring a blue stylized icon followed by the words "NATIONAL INSTRUMENTS" in black.



# OUR PAST RECRUITERS

 <b>TVS</b> <small>TVS MOTOR COMPANY</small>	 <b>INDIAN NAVY</b>	 <b>TATA</b> <small>TATA CONSULTANCY SERVICES</small>	 <b>Masamb</b>	 <b>IBM</b>	 <b>FINISAR</b>	 <b>TRIDENT GROUP</b>	 <b>JKT</b> <small>JK TECHNOSOFT</small>
 <b>TRANSWEB TUTORs</b>	 <b>amazon</b>	 <b>Google</b>	 <b>Epic</b>	 <b>SIGMOID</b>	 <b>ZEUS NUMERIX</b>	 <b>Tricon Infotech</b>	 <b>Cognizant</b>
 <b>BELZABAR SOFTWARE</b>	 <b>Bharat Petroleum</b> <small>Bharat Petroleum Corporation Ltd.</small>	 <b>Flipkart</b>	 <b>Resonance</b> <small>Educating for better tomorrow</small>	 <b>TATA MOTORS</b>	 <b>LARSEN &amp; TOUBRO</b>	 <b>Morgan Stanley</b>	 <b>DRDO</b>
 <b>SIEMENS</b>	 <b>Hero MotoCorp</b>	 <b>Microsoft</b>	 <b>Bank of America</b>	 <b>SAMSUNG</b> <small>ELECTRONICS</small>	 <b>edu vision</b> <small>Career Planning - Educational Services</small>	 <b>paytm</b>	 <b>CISCO</b>



## CONTACT US:

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