

Faculty Development Program On Theory and Simulations in Robotics

Under the banner of
Electronics and ICT academy at National Institute of
Technology Patna

01st June to 07th June, 2020



Patron

Prof. P. K. Jain
Director, NIT Patna

Convenor

Prof. Ramesh Kumar
Head, EE, NIT Patna

Coordinators

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Assistant Professor, Electrical Engineering,
NIT Patna

Organized by

Electronics and ICT Academy, National Institute of
Technology Patna, Patna- 800005. India.

www.nitp.ac.in/ict/

Supported by

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MeitY, Govt. of India.

About NIT Patna

National Institute of Technology Patna is the 18th National Institute of Technology created by the Ministry of H.R.D. Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. NIT Patna marked its humble beginning in 1886 with the establishment of pleaders survey training school which was subsequently promoted to Bihar College of Engineering Patna in 1924. This made this institute the 6th oldest Engineering Institute of India. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The campus has a picturesque river view with historic buildings presenting a spectacle of architectural delight and natural beauty. The Institute imparts high level education training, research and development in science, engineering technology and humanities along with high quality education and values at UG, PG and Ph.D. level. At present the Institute offers courses in six major technical disciplines viz. Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. And Mechanical Engg. It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

Electronics and ICT Academy

The Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programmes in niche areas of electronics and ICT for the development of required knowledge base, skills and tools to equip the teaching community with better knowledge and understanding.

Objective and Scope

The FDP on “Theory and Simulations in Robotics” brings an opportunity for all enthusiasts from different disciplines who like to learn and explore this interdisciplinary field of robotics. This course will help participants

- to get a concrete grasp on the various theories and concepts of robots
- Understanding the design and implementation across industries

Robotics is a field that mixes disciplines like dynamical system modelling, physics, mathematics, biology, electrical and electronics engineering, mechanical engineering, computer science and engineering and automation (sensors, control and actuators) technology. This is our attempt to get experts in all these domains from premier institutes of India to give participants a good experience for an introductory course on robotics.

Objectives of the Program

- To impart knowledge at an introductory level for the engineering academicians who are interested in robotics
- To promote the use of open source modeling and analysis softwares for robotics
- To introduce with a few cutting edge research in the field of robotics
- To motivate the participant’s interest in the field so more quality research can be generated

Topics to be covered

- Introduction to robot manipulators
- configuration space, task space, rigid body transformations
- Forward and inverse kinematics, velocity kinematics, Robot kinematics made easy using RoboAnalyzer

- Kinematic notations, DH Parameters, Kinematic parameters identification using geometric approach
- Motion Planning, Vision based control, Control design
- Multibody dynamics using ReDySim
- Wheeled Robots, Vision based control, legged robots
- Dynamic modelling of a serial robot, Force control algorithms

Resource Persons

For Expert lecture, and virtual lab sessions on open source softwares:

1. Prof. S. K. Saha, IIT Delhi
2. Dr. Suril Shah, IIT Jodhpur
3. Dr. Shishir N. Y. Kolathaya, IISc Bangalore
4. Dr. Arun Dayal Udai, IIT(ISM) Dhanbad
5. Dr. Aamir Hayat, SUTD Singapore
6. Dr. Gagan Deep Meena, NIT Patna

One-week FDP includes

Seven Days Training will be taken by a group of experts from IISc, IITs, NITs with the experience ranging from several years to several decades in delivering sessions in India and abroad. The training hour is 5-6 hours/ each day. Mode of training is Instructor-led live online.

- **40 Hours Instructor-led live online Hands-on based learning & Interactive Query Session.**
- Soft copy of study material, Training PPTs & Projects code
- Participants will get recorded sessions after completion of training

Who Can Participate

Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, Research scholars (PhD only), students and Industry personals, however priority will be given to the faculty members.

Registration Fee

- **Faculty/ Research Scholar (PhD): Rs. 500/-**
- **Students: Rs. 500/-**
- **Industry and others: Rs. 1000/-**

Registration Process

1. Registration fee will be paid through online mode, the account details for this purpose is

Account Name: NIT Patna

Account No.: 50380476798

IFSC Code: ALLA0212286

2. Registration link:
<https://forms.gle/5zAN8woD5HaR2vQTA>
3. The brochure of the program may be downloaded from the Institute website www.nitp.ac.in.
4. **Last date of registration: 29 May 2020**

Total -100 seats and the selection will be done on first-cum-first-serve basis. A PDF file of an online filled registration form with proof of registration fee paid will be sent through email to **Dr. Gagan Deep Meena. (email: gagandeep.ee@nitp.ac.in)**

<http://www.nitp.ac.in/ict/>

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REGISTRATION FORM

1. Name (block letter):
2. Gender:
3. Caste:.....
4. DOB:.....
5. Designation
6. Organization:
7. Address for communication:
.....
.....
Pin code: Ph. No.:
- E-mail:
8. Highest Academic Qualification:
9. Specialization:
10. Experience (in years):
(a) Teaching: (b) Industrial:
11. Aadhar No:.....

DECLARATION

I do hereby agree to abide by the rules and regulations of the FDP.

Place:

Date:.....

.....
Signature of the Applicant