



भारतीय प्रौद्योगिकी संस्थान पटना

Indian Institute of Technology, Patna

IITP/ACAD/PhD/2020/1
Dt17.03.2020

Ph.D. Admission – July 2020 (Autumn Semester, AY-2020-21)

Applications are invited for admission to the Doctor of Philosophy (Ph.D.) programme, starting in July 2020 in the following Departments. The areas of research in IIT Patna are as follows:

Department	Areas of Research
Chemical & Biochemical Engineering	Process system engineering, Process design and optimization, Process Integration, Energy management, Pinch Analysis, Renewable energy integration for process applications, Scheduling and optimization, System engineering for sustainable development, Production planning, Robust optimization, Fuzzy Logic, Artificial Intelligence in Process system engineering, Molecular Modeling and Simulation, Wettability, Ionic Liquids, Phase Equilibria, Novel Materials, Self Assembled monolayer, Advanced Oxidation Processes, Wastewater Treatment, Catalysis/Photocatalysis, Microwave-Assisted Material Processing, Separation Processes, Mass Transfer Operations, Downstream Processing, Food Processing, Applications in Photocatalysis, Plasma-Catalysis, Heterogeneous Catalysis, Computational fluid flow and heat transfer, Phase change materials, Thermal management of lithium-ion batteries.
Chemistry	Organic/Inorganic/Physical/Theoretical/Biochemistry/Biotechnology/Bioorganic/Supramolecular/Coordination/Polymer/Carbohydrate/Gas-Phase-Molecular Spectroscopy/Green/Nanotechnology/Biophysical/Solid-state/Materials/Experimental Physical/Chemistry and applications of macromolecules/synthesis and characterization of functional organic polymers and dyes
Civil & Environmental Engineering	Structural Engineering; Hydraulics and Water Resources Engineering: Groundwater and Surface water interaction; Transportation Engineering: Rail Track Geotechnology, Pavement Engineering, Intelligent Transportation Systems, Traffic Systems; Geotechnical Engineering; Environmental Engineering: Water and Wastewater Treatment, Waste Treatment and Resource Recovery, E-waste Management, Automated Waste Sorting.
Computer Science and Engineering	802.11 Wireless Network, Adhoc Networks and Sensor Networks, Artificial Intelligence, Big Data Computing, Bioinformatics, Bio-Text Mining, Blockchain & Smart Contract, Cloud Computing, Cloud Security, Complex Networks, Computer Vision, Consensus in Blockchain, Data Mining and Machine Learning Applications, Deep Learning Architectures/Systems, Discrete Event Modeling, Distributed Systems, Fault-Tolerant Computing, Formal Methods for Analysis and Verification, Hardware Security, Healthcare Analytics, Human-Computer Interaction, Image Processing, Information Extraction, Information Systems Security, Intelligent Transportation Systems, IoT Analytics, IoT Security, Machine Learning & Deep Learning, Machine learning applications in online social networks, Machine Learning on Graphs, Machine Learning Security, Medical Imaging, Mobile Social Computing, Multiobjective Optimization, Natural Language Processing, Online Algorithms, Optimization Techniques, Pattern Recognition, Programming Languages, Secure systems, Security & Privacy, Smart Energy Management, Social Networks, Soft Computing, Text Mining, Ubiquitous Computing & Embedded Engineering, VLSI Design and Methodologies, Wi-Fi Security, Wireless Networking

Electrical Engineering	<p>Power Systems, Smart Grid, Power electronics, Electrical Drives and Grid integration of renewal energy, Control Systems</p> <p>Wireless Communications and Digital Communication, 5G Communications, Digital communication, Optical communication and Photonics, Wireless Sensor Networks, Internet of Things (IoT), Cyber-Physical Systems, Molecular and MIMO Communications, Machine learning for wireless communication, Wireless Energy Harvesting , Millimetre Wave Communication</p> <p>Signal Processing, Applications of Signal Processing and Machine Learning, Biomedical Signal Processing, Signal Processing for wireless communication, Machine Learning and Internet of Things, Digital Signal Processing, Biomedical signal and Image processing, Neuro-cognition, Neural Signal Processing, Video Processing, Video Surveillance, Machine Learning and Deep learning.</p> <p>Semiconductor Devices and Circuits, Digital VLSI System, Embedded System, Computer Architecture, Edge Computing, Optoelectronics Devices, Semiconductor thin films, Sensors, Solar Cells, MEMS, Modeling & Simulation</p> <p>State estimation, Torpedo Tracking, Sensor management</p>
Humanities and Social Sciences	<p>English: Indian English Fiction, Gender Studies, South Asian Fiction, Indian writings in English and ELT</p> <p>Linguistics: Phonetics/Phonology, Morphology, Syntax, Language Documentation, Sociolinguistics, Linguistic Typology and Forensic Linguistics.</p> <p>Economics: Development economics, Microeconomics, Macroeconomics and Finance.</p> <p>Social Sciences: Migration and Diaspora Studies, Education and Society, Technosciences, Social Development, & Public Policies.</p> <p>Population and Public Health, Gender and Development, Environmental Health, Regional Development, & Health Care Management.</p>
Metallurgical & Materials Engineering	<p>Plasma Spray Coating, Mechanical Properties of Materials, Metal and Ceramic Matrix nano composites, Tribology of Materials, Process-structure-property Relationship, Solid State Chemistry, Materials Chemistry, Nanoparticles for Energy, Structural and Functional Applications, Structure- Property correlation of Dielectric, Ferroelectric, Multiferroic and other energy conversion Materials, Flash sintering of ceramics, Microstructure - property correlation in ceramics, Polymer blends and alloys, Polymer nanocomposites, Nanofillers, Hybrid nanofillers, Carbonaceous nanofillers like carbon dots and graphene</p>
Mathematics	<p>Mathematical Modeling, Biomathematics, Applications of Differential Equations, Nonlinear Dynamics. Associative Rings and Algebras; Polynomial Identities on Rings. Topology. Differential Geometry. Nonlinear Optimization; Variational Inequalities. Reliability Estimation, Survival Analysis, Estimation under Censored Data, Statistical Inference.</p> <p>Linear Algebra, Operator Theory, Mathematical Control Theory, Numerical Analysis for ODEs and PDEs. Mesh Refinement, Adaptive Higher Order Methods, Finite Element Analysis, Sobolev Spaces, Theoretical Analysis for ODE/PDE, Fractional and Integral Equations. Monotone Iterative Technique, Theory and Applications of Wavelets, Theory and Applications of ODEs and PDEs.</p>
Mechanical Engineering	<p>Design, Manufacturing, Mechatronics, and Thermal and Fluids</p> <p>For Project Fellow: Effect of burnup on ballooning and burst behavior of Zircaloy-4 cladding tubes under simulated LOCA</p>
Physics	<p>Ultrafast Spectroscopy & Biophysics; Applied Optics (optical signal processing, information security), Digital Holography, Orbital Angular Momentum; Quantum Optics (Experimental); Quantum Machine Learning; Biophotonics&Nanophotonics; High Energy Physics Phenomenology; Condensed matter physics (experimental), Multiferroics, Magnetic materials, Nanostructured materials; Nanomaterials for Energy and Sensing; Nanoscale device applications based on atomic switch technology; Renewable Energy</p>

Materials & Devices, EMI Shielding, Ferroelectrics & Dielectrics; Organic electronic devices; Condensed Matter Physics, Nanoelectronics, Spintronics; 2D Materials; Condensed Matter Theory; Computational Atomic and Molecular Physics

Applicants having external fellowship from recognized Government funding agencies are encouraged to apply.

CATEGORY OF ADMISSION:

The Institute admits Ph.D. students under the following categories:

1.1 REGULAR and FULL-TIME

A student in this category works full-time for her/his PhD degree. They can be classified as

1.1 a) INSTITUTE FELLOWS

She/he receives assistantship from the Institute. The qualifying Degree for Financial Support is:

1.1.1 BE/ BTech/ MSc/ MA/ MBA/ MCA /equivalent degree with valid GATE score above the prescribed cut off level/ NET qualification.

B.Tech from IITs with CGPA 8.0 and above are exempted from GATE qualification as per MHRD letter no. 17-2/2014-TS.I dated Feb 18, 2015.

1.1.2 ME/ MTech/ MPhil /equivalent degree with GATE/ NET qualification.

Age Limit: Please refer Eligibility Criteria for Admission into Ph.D. Programme

1.1 b) RESEARCH FELLOWS (JRF/SRF)

She/he receives fellowship from any government recognized funding agencies, such as CSIR, UGC, DBT, NBHM, DST (INSPIRE programme), etc

1.2 SPONSORED

A student in this category is sponsored by a recognized industrial R&D organization, academic institution (universities/colleges), government organization (defence or other ministries of the Government of India or any other government organizations including PSUs and autonomous bodies) or reputed industries (as may be recognized by this Institute) for doing research in the Institute. The Institute does not provide any assistantship/fellowship to such a student.

Candidate in Sponsored category must be a regular employee of the sponsoring organization (of repute) with a minimum of two-year job experience in the respective field. A student in this category is therefore a professionally employed person, who pursues PhD while continuing her/his services. The candidate has to work full time in institute to obtain the degree for a period of 3 years. **An intending sponsored candidate must submit his/her application in prescribed format (Form I, available with the application form) for admission through his/her employer, who will forward the same to the Institute with suitable endorsement.**

1.3 SELF-FINANCED

A student in this category may work full-time towards the PhD Programme. The Institute does not provide any assistantship/fellowship to such a student. The applicant should have qualified a national level exam (NET/GATE).

1.4 PROJECT STAFF

This category refers to a student who, as a project staff, is working on a sponsored project (registered in R&D Unit, IIT Patna). The said project staff is eligible to be admitted in the PhD Program (of this Institute) to work on a full-time basis. The minimum remaining duration of the project at the time of admission as well as tenure of the project employee should be at least 2 years from the date of joining the Ph.D. program. **She/he must have qualified GATE/NET.**

If the project gets completed before the student completes her/his PhD, her/his category will no longer be that of Project Staff and her/his category will be converted to that of SELF-FINANCED unless she/he is granted an assistantship/fellowship from the Institute or any other agency.

A project staff intending to join the PhD program of IIT Patna must submit her/his application in prescribed form (**form II, available with the application form**) for admission through Principal Investigator, Head of the Department and Dean/ Associate Dean R&D with suitable endorsement.

1.5 EMPLOYED & PART-TIME

A candidate in this category is a regularly employed person (including the staff of IIT Patna), who pursues the Ph.D. program, while continuing the duties of her/his service. The institute does not provide any assistantship/ fellowship to such a student. The minimum residential requirement is one or two semester(s) depending on the completion of mandatory course work required for Ph.D. students. Candidate in Employed and Part-time category must be a regular employee of his/her organization with at least two years of professional experience in the respective field. **The work-experience of minimum two years is essential with current employer.** NOC letter (**Form III, available with the application form**) must be attached with the duly filled in application form.

Minimum Eligibility Criteria for Admission in to Ph.D. Programme:

In all the disciplines, the upper age limit is **28 years (B.Tech./B.E./M.Sc./MA/MCA/MBA) and 32 years (M.Tech./M.E./M.S./M.Phil.)** to be calculated as on the last date of application, **07.04.2020**) and is applicable **only** for candidates applying in Regular and Full time category, as institute fellow. For Research/ project fellows, age limit will be as per the funding agency norms. In absence of any age criteria, the Institute norms will be followed. Upper age limit is relaxed up to 05 years in case of candidate belonging to Schedule Castes/Schedule Tribes, Women, Physically Handicapped and OBC applicants.

A.1 PhD in Engineering

For admission to the PhD Programme in Engineering Department, a candidate must satisfy one of the following criteria:

A.1.1 Candidates having M.Tech./M.E. degree in a Engineering/Technology, with a minimum CPI of 6.5 or 60% of marks.

A.1.2 Bachelor's degree in Engineering/Technology (from any Institute other than IITs) in a relevant area with a minimum CPI of 8.0 or 75% of marks.

A.1.3. Bachelor's degree from an Indian Institute of Technology (IIT) in a relevant area with a minimum CPI of 7.0.

A.1.4. Master's degree in Science in a relevant area with a minimum CPI of 7.5 or 70%.

A.2 PhD in Science

For admission to the PhD Programme in Science departments, a candidate must satisfy one of the following criteria:

A.2.1 M.Phil. or Master's degree in Science in a relevant area with a minimum CPI of 6.5 or 60% of marks.

A.2.2 Master's degree in Engineering/Technology in a relevant area with a minimum CPI of 6.5 or 60% of marks

A.2.3 Bachelor's degree in Engineering/Technology from an Indian Institute of Technology (IIT) in a relevant area with a minimum CPI of 7.0.

A.2.4 Bachelor's degree in a related area in Engineering/Technology (from any Institute other than IITs/IISc) in a relevant area with a minimum CPI of 8.0 or 75% of marks.

A.3 PhD in Humanities and Social Sciences

For admission to the PhD Programme in the department of Humanities and Social Sciences (HSS), a candidate must satisfy one of the following criteria:

A.3.1 M.Phil.or Master's degree in Arts/Commerce/Science in a relevant area with a minimum of 55% marks or equivalent.

A.3.2 Master's degree in Engineering/Technology/Design in a relevant area with a minimum CPI of 6.5 or 60% marks.

A.3.3 Bachelor's degree from an Indian Institute of Technology (IIT) in a relevant area with a minimum CPI of 7.0.

A.3.4 Bachelor's degree in Engineering/Technology (from any Institute other than IITs/IISc) in a relevant area with a minimum CPI of 7.5 or 70% marks.

Direct Admission (Waiver of Written Test):

For candidates in Sciences, Engineering &Technology:

The Institute may admit exceptionally bright students and Full-time (Institute Fellows) directly (i.e., without written test) into the Ph.D. program.

Eligible candidates meeting one of the following criteria may be considered for a waiver of the written test:

1. B.Tech. from the IITs, graduated within the last five years, with a degree in the respective discipline with a CPI/CGPA of 8/10 and above.
2. Masters from the IITs/IISc, graduated within the last five years, with a degree in the respective discipline with a CPI/CGPA of 8.5/10 and above.

Such a candidate has to apply online. Additionally, an email must be sent with scanned copy of the supporting documents to aracademic@iitp.ac.in.

There would be no admission in direct admission category in Department of Humanities and Social Sciences.

Relaxation for SC/ST Candidates:

Eligibility criteria will be relaxed by 5% marks or 0.5 CPI for SC/ ST applicants.

Reservations:

The reservation of seats in admissions for SC, ST, OBC, EWS categories and for Persons with Disability (PwD) will be as per Government of India rules. OBC (Non-creamy layer) candidates will have to enclose certificate and self-declaration statement as per formats as indicated at Annexure- I and II provided with the application form.

FINANCIAL SUPPORT:

The Institute assistantships will be available to eligible (Indian) students as per prevailing (MHRD, GoI) norms, as applicable from time to time. At present total emoluments are Rs 31,000/- per month.

Assistantships from external funding organizations will be available as per terms and conditions of the concerned funding organizations.

Students receiving assistantships from the Institute or fellowships from any other funding agencies are required to perform academic duties as per prevailing norms.

The continuation of the assistantship/fellowship is subject to satisfactory performance of the assigned duties and satisfactory progress of the student in the Ph.D. Programme.

APPLICATION PROCEDURE:

The application fee of **Rs. 300/- for General/OBC/EWS** (Male) candidates and **Rs. 150/- for SC/ST/PwD/Female** (all categories) candidates, must be submitted online through SBI Collect.

Link for payment: <https://www.onlinesbi.com/prelogin/icollecthome.htm?corpID=595859>

After the payment, a reference/journal number will be generated, which must be mentioned in the application form and the printed e-receipt of payment must be preserved along with the hard copy of application.

Candidates are required to use the following link to fill and submit application form online.

Link:<http://academic.iitp.ac.in>

For application, the online link will remain active till, 07.04.2020. Please login and fill up all the parts of the application form. Follow the instructions given in the document “*Instructions to Candidates*”. At the end a final PDF will be generated. The candidates are required to download it from their registered email address or from their application page.

Candidates, applying for more than one department, must submit a separate application with separate fee- payment for each application.

The candidates are required to take printout of the final submitted application generated online. They are NOT required to send application by post. The duly signed hard copy of application along with self attested copies of mark sheets & certificates (from class X to highest degree obtained/appeared), caste certificate (if applicable), GATE /NET/Relevant certificate related to any fellowship, experience certificate, other testimonials (both sides) and printed e-receipt of online payment must be brought on the day of test/interview, failing which their candidature is liable to be rejected. Please note that the application must be complete in all respects, along with all documents, including e-receipt of payment. If any of the prescribed documents (as mentioned above) is not produced on the day of test/interview, they shall not be allowed to appear in the test/interview.

No call letter will be sent by post. The candidates should check email and website regularly for important information. At the time of test/interview, a candidate must bring his/her valid original Identity card.

Selection:

The Institute reserves the right to call a limited number of candidates for written test or/ and interview, based on performance in GATE/NET, grades/marks in the qualifying examination, etc. and merely fulfilling minimum eligibility criteria does not guarantee call for test/interview.

Important Dates:

Start Date of On-line Application: 17.03.2020

Last Date of On-line Application: 07.04.2020

Note:The above information is not the complete set of Rules & Regulations for the Ph.D. programme of IIT Patna

Helpline:

S.N.	Issues	Email id	Phone
1	Academic matter	tarique@iitp.ac.in	0612-302-8684
		aracademic@iitp.ac.in	0612-302-8697
2	Fee -payment/ SBI collect link	arfa@iitp.ac.in	0612-302-8062
3	Technical matter for online application (except fee)	skverma@iitp.ac.in	0612-302-8333

Legal Jurisdiction:The court at Patna alone shall have the jurisdiction to settle and decide all matters and disputes related to the above referred admission process.