भारतीय प्रौद्योगिकी संस्थान मण्डी
Indian Institute of Technology Mandi

PhD Admissions

Information Brochure

CONTENTS

IIT Mandi invites applications for the Doctor of Philosophy (PhD) program in a variety of disciplines and interdisciplinary areas. The institute offers PhD program through its different Schools/Centers. The award of this degree is in recognition of high academic achievements, independent research, and application of knowledge to the solution of technical and scientific problems in engineering, technology, and sciences including social sciences.

(A) Important Guidelines for PhD Application

1. Please read the instructions given in the brochure carefully before filling up the applications.

2. **Online** Application form & Information brochure (Including the admission schedule along with the important dates) is available on the institute website at the following link: https://www.iitmandi.ac.in/msphd-admissions

3. You are required to submit the application form ONLINE. No Downloadable Forms will be available after filling the form, you are advised to take a print of your application for your records.

4. For each specialization, candidate should submit a separate application with the application fee.

5. The application fee is as follows:

Category	Amount in ₹
General/EWS/OBC/OBC(NCL)/Transgender/Foreign Nationals	200
Women/SC/ST/PD	100

   a. *Mode of Payment: SBI Collect Portal.*

   b. Applicant should submit fee on SBI collect portal of the IIT Mandi and submit generated transaction number to the OAS admission application portal Link: (https://www.onlinesbi.com/sbicollect/icollecthome.htm)

   c. One application fee is valid for the single application. The application fee is **NON-REFUNDABLE**.

6. OBC candidates may note that the limit for annual income is Rs. 8 Lakhs for determining the creamy layer among Other Backward Classes (OBCs) candidates. The OBC (NCL) certificate issued for the financial year 2022-23 by the Competent Authority in the prescribed format must be uploaded in the ONLIINE application form.

7. Economically Weaker Sections (EWS) candidates may note that the limit for annual income is Rs. 8 Lakhs for determining the eligibility for benefit under Economically Weaker Sections (EWS) reservation. The EWS certificate issued by the Competent Authority in the prescribed format must be uploaded in the ONLINE application form and submitted at the time of admission.

8. Seats are reserved for Economically Weaker Sections (EWS)/Other Backward Class Non-Creamy Layer (OBC-NCL)/Schedules Caste (SC)/Scheduled Tribe (ST) and Person with Benchmark Disability (PwD) categories as per Government of India norms.

9. You should check Institute website for results/important announcements.

10. You should check emails sent to your email address provided in your application for all important communications and announcements if any.

11. Merely fulfilling eligibility criteria does 'not entitle a candidate to be called for the written test/interview. Decision of Institute authorities will be final. Admission is based on GATE/Written test/Interview performance in addition to general eligibility criterion, the applicants must also satisfy the eligibility criteria specified for the respective Departments / Centres / Schools / Interdisciplinary Groups.

12. Candidates, if called for written test/interview should show/ bring with them (i) Photo ID Card, (ii) Printed copy of the application submitted online, (iii) Thesis / dissertation / report / publications (iv) copy of certificates and mark-sheets

13. **The link to apply online is :** http://oas.iitmandi.ac.in/admission .

(B) Important Dates for admission:

Starting date for filling Online Application	17th April, 2023
Last date for filling Online Application	7th May, 2023
Declaration of shortlisted candidates list	Will be Published on IIT Mandi website
Shortlisted candidates will be informed by email	

(C) Contact details:

In case of any query related to the Ph.D. Programme admission process you may contact respective school/Centre, the contact details are:

Name of School/Centre	Email ID	Contact No.
Centre Artificial Intelligence and Robotics (CAIR)	cairoffice@iitmandi.ac.in,	----
School of Biosciences & Bioengineering	sbboffice@iitmandi.ac.in	01905-267061
School of Chemical Sciences	scsoffice@iitmandi.ac.in	01905-267277
School of Civil & Environmental Engineering	scene_admissions@iitmandi.ac.in	----
School of Computing and Electrical Engineering	sceeoffice@iitmandi.ac.in	01905-267071
School of Humanities & Social Sciences	shssoffice@iitmandi.ac.in	01905-267719
Indian Knowledge System and Mental Health Application (IKSMHA)	iksmha@iitmandi.ac.in	---
School of Management	somoffice@iitmandi.ac.in	01905-267119
School of Mathematical & Statistical Sciences	smssoffice@iitmandi.ac.in	01905-267929
School of Mechanical and Materials Engineering	smmeadmissions@iitmandi.ac.in	01905-267138
School of Physical Sciences	spsoffice@iitmandi.ac.in	01905-267812

(D)About the Institute

The Indian Institute of Technology Mandi (IIT Mandi), one of the premier technical institutes in India. IIT Mandi was established in 2009 with the aim of providing world-class education and cutting-edge research in engineering, science, and technology. Since its inception, the institute has strived to achieve excellence in education, research, and innovation.

Located in the scenic town of Mandi in the Himalayan foothills, the institute offers a unique learning experience to its students. With state-of-the-art facilities and world-class faculty members, IIT Mandi provides a conducive environment for research and learning. The institute offers undergraduate, postgraduate, and doctoral programs in various disciplines of engineering, sciences, and humanities.

At IIT Mandi, we believe in fostering an environment of innovation and creativity. Our faculty members are renowned experts in their fields and are committed to providing their students with the best possible education. With our multidisciplinary approach to education, we aim to produce graduates who are well-rounded and equipped to solve real-world problems.

We take pride in our research culture and encourage our students to engage in cutting-edge research in various fields. Our research facilities are equipped with state-of-the-art equipment and resources, providing our students with ample opportunities to explore their interests and pursue their passions.

We invite you to join our community of scholars and innovators at IIT Mandi and be a part of our journey towards excellence in education and research.

(E) Academic Structure and PhD Programme

IIT Mandi offers a comprehensive academic structure for PhD programs in various disciplines of engineering, sciences, humanities and management. Our PhD programs are designed to provide a rigorous and in-depth understanding of the chosen field of study.

The duration of our PhD program is typically 3-5 years, during which students will be exposed to a wide range of academic activities such as coursework, research, seminars, and workshops. The academic structure of our PhD program is as follows:

- Coursework: At the beginning of the program, students will be required to complete a set of coursework to develop a strong foundation in the chosen field of study. The coursework will typically involve advanced topics in the chosen field of study and will be designed to equip students with the necessary skills and knowledge to pursue research in their respective fields.
- Comprehensive Examination: After the completion of the coursework, students will be required to take a qualifying comprehensive examination to demonstrate their understanding of the coursework and readiness to undertake independent research.
- Research: The research phase of the PhD program is the most important and the longest. Students will be required to conduct original research in their chosen field of study, under the guidance of a faculty advisor. The research phase will involve the development of a research proposal, data collection, analysis, and interpretation, and the writing and defending of a thesis.

- Seminars and Workshops: Throughout the program, students will be required to attend and present their research at various seminars and workshops. This will provide students with an opportunity to interact with experts in their field and to receive feedback on their research.

At IIT Mandi, we believe in providing our PhD students with a well-rounded education that prepares them for a career in academia, industry, or government. Our PhD programs are designed to produce graduates who are not only experts in their chosen field of study but also possess the necessary skills and competencies to succeed in their future endeavours.

(F) Schools/Centres

Faculty members belong to broadly and loosely defined Academic Schools/Centres. Each School/Centre provides a home base for faculty whose interests share some fundamental academic principles. Some faculty members also have joint appointments in other Schools. By broadly grouping faculty members into Schools/Centres, IIT Mandi has avoided traditional departments and divisions within the institute. This has been done with a view to actively foster an interdisciplinary culture and collaborative research and projects across disciplines within the institute. The details about the different postgraduate and doctoral programmes in different schools/centre can be found in the below mentioned table.

Name of School/Centre	Information Brochure
Centre Artificial Intelligence and Robotics (CAIR)	CAIR-PG-Brochure
School of Biosciences & Bioengineering	SBB-PG-Brochure
School of Chemical Sciences	SCS-PG-Brochure
School of Civil & Environmental Engineering	SCENE-PG-Brochure
School of Computing and Electrical Engineering	SCEE-PG-Brochure
School of Humanities & Social Sciences	SHSS-PG-Brochure
Indian Knowledge System and Mental Health Application (IKSMHA)	IKSHMA-PG-Brochure
School of Management	SoM-PG-Brochure
School of Mathematical & Statistical Sciences	SMSS-PG-Brochure
School of Mechanical and Materials Engineering	SMME-PG-Brochure
School of Physical Sciences	SPS-PG-Brochure

(G) List of Research-based Programmes at IIT Mandi:

Sr. No.	Name of Programme	Discipline, School/Centre
1.	Doctor of Philosophy (Ph.D.)	Artificial Intelligence and Robotics (CAIR), Biosciences & Bioengineering, Chemical Sciences, Civil & Environmental Engineering, Computing and Electrical Engineering, Humanities & Social Sciences, Indian Knowledge System and Mental Health Application (IKSMHA), Management, Mathematical & Statistical Sciences, Mechanical and Materials Engineering, Physical Sciences
2.	M.Tech (Research)/ MS(Research)/ MA(Research)	Fluid and Thermal Engineering, Materials and Energy Engineering, Mechanical Design, Manufacturing, Computational mechanics, Product Design / Electric Vehicles / Robotics / Mechatronics / Biomechanics, Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Environmental Engineering, Geomatics Engineering, Control and Automation, Computer Science and Engineering, Data Analytics, Differential Equations / Deep Learning / Control Problems / Computing, Computational Finance, Machine Learning, Biotechnology, Robotics, Cognitive Engineering & Indian Thought System
3.	M.Tech	Fluid and Thermal Engineering, Materials and Energy Engineering, Structural Engineering, Communications and Signal Processing (CSP, Very Large-Scale Integration (VLSI)), Electric Transportation, Computer Science and Engineering, Power Electronics and Drives, Biotechnology
4.	Master of Technology (Research) +Ph.D. (Dual Degree)	Artificial Intelligence and Robotics (CAIR), Biosciences & Bioengineering, Civil & Environmental Engineering, Computing and Electrical Engineering, Mathematical & Statistical Sciences, Mechanical and Materials Engineering, Indian Knowledge System and Mental Health Application (IKSMHA)

(H) Research Facilities

IIT Mandi has state-of-the-art research facilities that provide an ideal environment for cutting-edge research across various disciplines. The institute has made significant investments in the establishment of these facilities, which are continuously upgraded to keep pace with evolving technologies. Some of the research facilities available at IIT Mandi are:

- **Advanced Materials Research Centre (AMRC)**: AMRC is equipped with advanced analytical tools and equipment for research in the field of materials science and engineering. The lab is equipped with instruments such as XRD, SEM, TEM, XPS, Raman spectrometer, etc.

- **BioX Centre**: BioX is a research centre and has state-of-the-art facilities for research in the broad areas of biosciences and bioengineering. Apart from various sophisticated equipment, the centre also has microbial and mammalian cell culture facilities, Model organism facilities (like C. elegans) and animal house.

- **Centre for Design and Fabrication of Electronic Devices (C4DFED)**: C4DFED is a research facility that focuses on the development of electronic devices and circuits. The centre is equipped with modern tools and equipment for fabrication and characterization of electronic devices along with class 100 clean room.

- **High-Performance Computing (HPC) Facility**: IIT Mandi has a dedicated HPC facility that provides researchers with access to high-performance computing resources for complex simulations and data analysis.

- **Central Library:** The Central Library IIT Mandi, is a very special place in the IIT Campus with its rich collection of books and journals in the field of Engineering Science & Technology and related areas. The library stands as a unique Knowledge Centre that offers access to essential and specialized information resources and services to meet the growing information needs of its users. IIT Mandi Library operations are automated using KOHA. The library currently houses over 43392 books (21618 print books & 21774 e-books) and provides access to more than 48746 e-resources.

- **Workshop Facilities:** The workshop facilities at IIT Mandi are well-equipped and provide practical training to students in various engineering fields. The workshop facilities include a machine shop, welding shop, carpentry shop, foundry, and electrical and electronics labs. These facilities have various tools and machines such as lathes, milling machines, drill machines, CNC machines, welding machines, and other necessary equipment.

(I) Application Information:

The brochure contains detailed information about the branches offered for admissions, specific qualifications required, tentative modes of admission, important dates, and other relevant details. Each school/Centre appoints an admission committee who will oversee the admission process.

(J) General Qualifications for PhD programs:

(J.1) REGULAR FULL TIME SCHOLARS

Ph.D. in Engineering/Sciences/Humanities
   (a) Candidates with a Master's degree in Engineering/Technology/Science/Other with a good academic record or a Master's degree by research in Engineering/Technology disciplines, with a good academic record.

<div align="center">or</div>

   (b) Candidates with Master's degree in Sciences with a good academic record and of exceptional merit are eligible for the relevant Engineering discipline and with a valid GATE score or UGC/CSIR NET/NBHM or equivalent qualification in the relevant area tenable for the year of registration. In the case of candidates with more than 5 years of relevant experience after the Master's degree, the requirement of a test score may be waived by the Selection Committee.

(NOTE: In case candidate have Master's degree in sciences applies for Ph.D. Programme in Engineering, the candidate is required to have valid GATE score for fellowship of MoE/Institute. However if a candidate have Master's degree in Sciences applies for Ph.D. Programme in sciences he is required to have GATE or UGC/CSIR NET/NBHM or equivalent qualification once in academic career.

<div align="center">or</div>

(c) Candidates who have qualified for the award of Bachelor's degree in Engineering/Technology with exceptionally good academic record in an eligible discipline will be considered for direct admission (without previous Master's Degree) to Ph.D. Programme as a regular full time scholar subject to the following conditions:

    I.   B. Tech / BE degree from Centrally Funded Technical Institutes (CFTIs), with a minimum CGPA of 7.5 on a 10.0 point scale (or equivalent). **(National Level examination are waived off for HTRA Scholarship)**

    II. Bachelor's degree in Engineering/Technology from Non-CFTIs with valid GATE or other equivalent national exam qualification (Validity required at the time of joining) and CGPA of at least 7.5 out of 10.0 (or equivalent).

    III. Bachelor's degree holder in Engineering/Technology, serving for two years or more in a reputed R&D Organization and having a proven research record.

(J.2) PH.D. UNDER PART -TIME /EXTERNAL REGISTRATION PROGRAMME CATEGORY:

The required qualification for both programmes remain the same as for the regular candidates as mentioned above except for the requirement of qualifying in one of the national entrance tests. Additionally, the candidate should have atleast two years of work experience as mentioned above.

(J.3) Project to Ph.D. Admission:

This category includes project staff working on research projects in the Institute who have worked on such projects for a period of 6 months or more. They may be considered for admission to the Ph.D. Programme (guided by the same PI only) with strong support of the candidature by the PI. The selection procedure will be same as for the regular Ph.D. Programme. The minimum educational qualifications are the same as for regular Ph.D. Programme.

In addition to general eligibility criterion, the applicants must also satisfy the eligibility criteria specified for the respective Departments / Centres / Schools / Interdisciplinary Groups. Over and above the general eligibility criteria for admission, candidates need to satisfy additional criteria for financial support / fellowship, as specified under specific admission categories [Please refer Table-I].

The final selection process to Ph.D. programme to any Centres / Schools at IIT Mandi will be through written test and/or interview as specified by individual Centre / Schools.

Table-I

	School/Centre	Broad Research Areas	Qualification for Admission
1.	**AI and Robotics**	**Robotics:** • AI-based robotics • Multi-Agent robotics • Haptics and Teleoperation robotics • Underwater robotics • Medical/Healthcare robotics. **Artificial Intelligence:** • Healthcare • Core AI research • Systems for AI • AI for Society and Environment. **Drone Technology**	Master's degree in Sciences/Engineering/ Technology with a good academic record and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. **Or** Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. **Or** Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
2.	**Biosciences and Bioengineering**	• Cardiac Fibrosis mediated Heart Failure • Tissue engineering • 3D Bioprinting • Regenerative Medicine • Biomaterials • Cell and Molecular Biology • Neuroscience • Aging • Stress response • Protein homeostasis • Nanomedicine • Nanosensing • Metabolic Systems Biology • Metabolomics • Fluxomics • Phytochemistry • Cellular Bioprocessing • Plant microbial metabolism • Climate Controlled Agriculture • Metabolic and Molecular Mechanisms of Nonalcoholic Fatty Liver Disease (NAFLD) • Cell Signaling in insulin secretion • Molecular and metabolic mechanisms of insulin resistance i n type 2 diabetes • Host-pathogen interaction, Immunology, • Computational and Systems Biology	Master's degree in Sciences/ Engineering/ Technology with a good academic record and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. **Or** Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. **Or** Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.

		• Next generation sequencing applications, • Gut Microbiome and gut associated diseases • Autoimmune diseases • Microbial consortia formulation for environmental pollutant degradation.	
3.	**Chemical Sciences**	• Flow synthesis of nanomaterials & Continuous flow chemical reactions • Theoretical chemistry • General Chemistry • Organic synthesis and Polymer synthesis • Applied chemistry, Polymer chemistry and Nanomaterials • Electrocatalysis, battery and renewable energy • Inorganic Materials/ coordination compounds for materials and catalytic applications • Green Chemistry and Heterogeneous Catalysis • Computational Chemistry and Transition Metal Catalysis • Theoretical and computational study of chemical, physical and biological systems • Transition Metal-Catalyzed C-H Functionalization • Physical Chemistry, Spectroscopy, microscopy bioimaging of nanomaterials for health care application.	Master's degree in Sciences/ Engineering/ Technology with a good academic record and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. **Or** Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. **Or** Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
4.	**Civil and Environmental Engineering**	• Geotechnical engineering • Water resource Engineering • Environmental Engineering • Structural Engineering	**Geotechnical:** B. Tech/B.E. in Civil/Construction/Mechanical Engineering or related areas + M.Tech/M.E./MS in Geotechnical/Structural/Environmental /Transportation Engineering/ Solid or Thermo-fluid (Mechanical) Engineering or related areas + GATE Qualified at least once in their academic career. **Water resource Engineering:** B. Tech in Civil/Agriculture/ Environmental engineering or related areas + M.Tech. in Water Resources/Hydrology/Hydraulics/Hydrogeology/River Engineering/Irrigation/ Hydro informatics/Earth Sciences/Geomatics/Remote Sensing and GIS or related areas + GATE Qualified at least once in their academic year.

			Environmental Engineering B. Tech in Civil/Agriculture/ Chemical / Environmental Engineering/Biotechnology or related areas + M.Tech. in Environmental Engineering/ Chemical Engineering / Irrigation/Water Resources/ Hydrogeology/ Geo-environmental/Biochemical/ Biotechnology/ Agriculture Engineering or related areas + GATE Qualified at least once in their academic year. **Or** M.Sc in Environmental science / Chemistry / Geology (Geosciences / Earth Sciences)/ life science (Microbiology / Biotechnology) or related areas + NET/GATE Qualified at least once in their academic year. **Structural Engineering** B. Tech in Civil Engineering or related areas + M. Tech in Structural Engineering or related areas + GATE Qualified at least once in their academic year. *Additionally, the candidates with B. Tech degree with exceptionally good academic record may apply for direct admission to regular full time PhD:* • B.Tech/BE degree from Centrally Funded Technical Institutes with a minimum CGPA of 7.5 on a 10.0 point scale (or equivalent). • B.Tech/BE degree from Non-Centrally Funded Technical Institutes with valid GATE or other equivalent national exam qualification and CGPA of at least 7.5 on a 10.0 point scale (or equivalent). • B.Tech/BE degree and serving for two years or more in a reputed R&D organisation and having a proven research record.
5.	**Computing and Electrical Engineering**	• Theoretical Computer Science and Computer Systems • Intelligent Systems • Signal Processing and Communications • Power Engineering, Control and Automation • VLSI - design and fabrication	Master's degree in Engineering/ Technology with a good academic records and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. **Or** Master's degree in Sciences with a good academic record and with a valid GATE score or UGC/CSIR NET or DST Inspire or other equivalent national level examination. *Additionally, the candidates with B. Tech degree with exceptionally good academic record may apply for direct admission to regular full time PhD:* • B.Tech/BE degree from Centrally Funded Technical Institutes with a minimum CGPA of 7.5 on a 10.0 point scale (or equivalent). • B.Tech/BE degree from Non-Centrally Funded Technical Institutes with valid GATE or other equivalent national exam qualification and

			CGPA of at least 7.5 on a 10.0 point scale (or equivalent). • B.Tech/BE degree and serving for two years or more in a reputed R&D organisation and having a proven research record.
6.	**Humanities and Social Sciences**	• Economics • English Literature • German Literature • World Literature • Translation Studies • Sociology • Himalayan Studies • History • Development Studies • Demography	• Postgraduate degree in Anthropology, Sociology, History, Political Science, Economics, English, Psychology, Philosophy, or related disciplines with a minimum 55% mark or CGPA of 6.0 on 10 points. • Must have qualified UGC–JRF/NET/GATE/ or equivalent examination.
7.	**Indian Knowledge System and Mental Health Applications (IKSMHA) Centre**	**Indian Knowledge System** • Integrative study of body, mind and consciousness • Scientific characterization of brain network with the intervention of Yoga and Meditation Learning • Mind-brain paradigm from Ayurveda or Bhagavata Samkhya • Indian Performing Arts and Cognition **Cognition** • Neuroscience • Cognitive Psychology • Cognitive Science • Human Factors • Cognitive Technology and Bio/Neurofeedback • Judgment and Decision Making • Virtual reality and sensors (Virtual Reality Applications) • Bio/Neuro/Physiological (Sensing) • Mental Health Applications (Depression, Stress and cognitive loading, Sleep)	Master's degree in Sciences/ Engineering/ Technology with a good academic records and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. Or Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. Or Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. Or Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
8.	**Management**	• Entrepreneurship • Consumer Behavior • Technology Adoption • Marketing Communication • Business Analytics • Machine Learning and Artificial Intelligence	• Master's degree in Management/Arts/Commerce/Sciences/ Engineering/ Technology with a good academic record and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. • Four Years Bachelor's degree holder in Management/Arts/Commerce/Sciences/ Engineering/ Technology with valid GATE score

			or other National level exam at the time of admission. • Four Years Bachelor's degree holder in Management/Arts/Commerce/Sciences/ Engineering/Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
9.	**Mathematical and Statistical Sciences**	**Mathematics** • Differential Equations and Mathematical Control Problems • Frame theory • Wavelet Analysis • Harmonic Analysis • Function spaces • Mathematical Modelling • Algorithms for time series and dynamical prediction • Climate Change • Indian monsoon rainfall • Extreme events like cloudbursts • Harmonic Analysis • Frame Theory • Dunkl Transform • Applied Topology and Combinatorics • Control Optimization Problem • Computational Fluid Dynamics • Numerical Methods for PDEs • Classical K-theory **Statistics and Machine Learning** • Statistical Inferences (Competing Risks Accelerated Life Testing, Reliability) • Machine Learning • Data analytics • Optimization • Computational Finance	Master's degree in Sciences/ Engineering/ Technology with a good academic records and also qualified GATE or UGC/CSIR NET or DST Inspire or other equivalent national level examination. **Or** Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. **Or** Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
10.	**Mechanical and Materials Engineering**	**Mechanical Design** • Acoustics • Solid Mechanics and Design • Computational Solid Mechanics • Continuum Mechanics • Fracture-Fatigue • Functionally Graded Materials	**Mechanical Design** B. Tech in Mechanical/ Aerospace Engineering / Related Areas + M. Tech in Machine Design / CAD / CAE/ Aerospace/ Applied Mechanics/ Biomedical/ Robotics/ E-Transport Engineering

		- Mechanics of Composite Materials - High Technology Materials and Structures - Machine Design - Vibration - Smart material/Structure - Electric Vehicles - Piezoelectric Energy Harvesting - Finite Element Method - Modeling & Control - Biomechanics - Orthopedic Biomechanics - Implant Design - Bone & Biomaterial Fracture - Deformation induced emissions - Structural health monitoring - Smart materials and structures - Vibration energy harvesting	or related areas + GATE qualified in Mechanical Engineering at least once in academic career **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/Related Areas from any CFTIs with a minimum CGPA of 7.5 on a 10.0-poin scale. **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/ Related Areas from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score in relevant subject or other National level exam at the time of admission. **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/ Related Areas and serving for two years or more in a reputed R&D organization and having a proven research record.
		Fluid Thermal - Alternative Fuels - Battery Management - IC Engines - Emissions Control - Experimental Fluid Dynamics - Spray Atomization & Combustion - Advance Laser Diagnostics & Image Processing - Snow avalanche dynamics - Multiphase flows - Computational fluid dynamics - Population balance modelling - Non-Newtonian fluids - Fluid Mechanics - Thermal Science and Engineering - Thermal Radiation - Solar Radiation - Collimated Beam Radiation - Non-gray Radiation - Interface capturing - Mesoscale simulations - Probes and instrumentation for two-phase flow - Experimental Nanofluidics - Liquid Phase Electron Microscopy	**Fluid Thermal** B. Tech in Mechanical/Aerospace/ Related Areas Engineering or related areas+ M. Tech in Fluid/Thermal Engineering, E-Transport or related areas + GATE qualified in Mechanical/Aerospace Engineering **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/Related Areas from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/ Related Areas from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score in relevant subject or other National level exam at the time of admission. **Or** Bachelor's degree holder in Mechanical/ Aerospace Engineering/ Related Areas and serving for two years or more in a reputed R&D organization and having a proven research record.

Manufacturing	**Manufacturing**
• Additive Manufacturing (Metal, Polymer - Particulate, Short and Continuous fiber, Ceramics) • Cyber Security in Additive Manufacturing • AI and Machine learning in Manufacturing • Design and development of Composites for specified application • Waste utilization • Additive manufacturing (Extrusion based Metal and Continuous Fiber Reinforced composites 3D printing) • Highly filled (metal, short fibre filament production) • LCA • Advanced Manufacturing • Perovskite Solar Cells • Solar Thermal utilization • Energy Storage • Advanced Manufacturing Processes for Polymer Composites • Sustainable Biocomposites • Recycling of Polymer Composites • Surface Engineering and Experimental Tribology	B.Tech in Mechanical/production/Materials/Metallurgy + M.Tech in Mechanical/ Production / Mechatronics/Manufacturing /CAD /Design/Materials/Metallurgy or related areas + GATE qualified in Mechanical/Metallurgy Engineering **Or** Bachelor's degree holder in Mechanical/ Production/Materials/Metallurgy/Related Areas from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Mechanical/ Production/Materials/Metallurgy/ Related Areas from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score in relevant subject or other National level exam at the time of admission. **Or** Bachelor's degree holder in Mechanical/ Production/Materials/Metallurgy/ Related Areas and serving for two years or more in a reputed R&D organization and having a proven research record.
Materials Engineering • Glasses for Electrical Applications • Solid State Refrigeration • Pyroelectric Energy Harvesting Materials and Methods • Piezoelectric Energy Harvesting Materials and Methods • Carbon based micro/ nano devices • Microstructure and crystallinity of sp2 carbons • Waste-derived carbon • Nano-manufacturing for Electronics Sensor and Microsupercapacitor applications	**Materials Engineering** B. Tech in Mechanical / Chemical /Materials/Metallurgy + M. Tech in Energy/Manufacturing/Materials/ Metallurgy or related areas **Or** Bachelor's degree holder in Mechanical / Chemical/Materials/Metallurgy Engineering from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Mechanical / Chemical/Materials/Metallurgy Engineering from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score in

		• Vapor Phase Growth(CVD, PVD & ALD) of Functional Nanostructures and Thin films • Phase Transition in Functional Oxide Materials and Thin Films • Nano-mechanics of Phase Change Materials and 2D Materials • Analytical Microscopy and Imaging **Materials Science** • Drug Delivery System, Biosensors • Micro porous membranes • Multifunctional hybrid material • Condensed Matter Physics and Materials Science	relevant subject or other National level exam at the time of admission. **Or** Bachelor's degree holder in Mechanical / Chemical/Materials/Metallurgy Engineering and serving for two years or more in a reputed R&D organization and having a proven research record. **Materials Science** M.Sc. in Physics/Chemistry + valid GATE/NET score OR M. Tech in Nano Materials /Nanotechnology/Energy /Polymer/Material science /Chemical Engineering or related areas **Or** Bachelor's degree holder in Engineering/Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score in relevant subject or other National level exam at the time of admission. **Or** Bachelor's degree holder in Engineering/Technology and serving for two years or more in a reputed R&D organization and having a proven research record.
11.	**Physical Sciences**	• Experimental Condensed Matter Physics • Nanomaterials and Quantum Transport • Soft Matter / Physics of Complex System • Theoretical Atomic Physics • Quantum Optics and Nano Photonics • Experimental High Energy Physics • Gravitation and Cosmology	Master's degree in Sciences/ Engineering/ Technology with a good academic record and also qualified GATE or UGC/CSIR NET or DST Inspire or other. equivalent national level examination. **Or** Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale. **Or** Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score or other National level exam at the time of admission. **Or**

			Bachelor's degree holder in Engineering/ Technology and serving for two years or more in a reputed R&D organization and having a proven research record.

NOTE:

- *B. E./AMIE / Other Equivalent exams are considered as B. Tech.*
- *M. E. / M. S. (by Research) / M.Tech. (by Research) or other equivalent exams are considered as M.Tech.*

(K) Shortlisting:

Each school/centre has its own shortlisting committees. These committees set the shortlisting criterion for each stream. The shortlisting criterion is generally different for each school and each specialization. The minimum qualifications are advertised in the notification. The shortlisting committees may set higher shortlisting criterion than advertised. The shortlisted candidates' details along with shortlisting criterion will be published on the institute's website. Shortlisted candidates may receive email regarding the admission procedure details on the provided Email ID in the application form.

(L) Admission Process:

Various committees in each school/centre conduct the admission process independently. The admission process may have written test or interview or both. Based on the performance of the candidates, committees will recommend the suitable candidates for admission. Whenever there is a written test, GATE syllabus will be treated as standard syllabus, unless otherwise specified.

Selected candidates' details are published in the institute website. Selected candidates will get the admission offer letter from the academic section along with fee and other details. A waitlist is normally maintained to offer admission to the deserved candidates. Selected candidate has to pay the fee within the stipulated time and reserve the seat, since the academic sessions start as per the Institute's calendar.

Fees details: (https://iitmandi.ac.in/fees)

Tentative institute fee amounts (as per approved fee structure for AY-2022-2023) payable at the time of Admission (in Rs.)			
Indian National			**Foreign National**
Regular Ph.D. Programme		Ph.D. Sponsored/External Registration Programme (ERP) & Part Time Programme	Ph.D. Programme
UR/OBC(NCL)/EWS	SC/ST/ PwD		
Rs. 41,250/-	Rs. 31,250/-	Rs. 81,250/-	Rs. 1,42,250/-
Boarding & lodging: Hostel Charges :14400/- *Mess Charges (to be paid to the vender through Institute as per actual, approx. rate (Rs. 22800/-)*			*Boarding & lodging:* Hostel Charges: Rs.43200/- *Mess Charges (to be paid to the vender through Institute as per actual, approx. rate (Rs. 22800/-)*

(M) Financial Assistance:

(M.1) Full – Time Research Scholar:

(M.1.1) Institute Research Scholars with Teaching Assistantship (HTRA)

Students under this category are entitled for the Scholarship/ Assistantship from Institute / MoE if they qualify any one of the following criteria.

- Master's degree in Sciences/ Engineering/ Technology with a good academic record and also qualified GATE or other equivalent national level examination.
- Bachelor's degree holder in Engineering/ Technology from any CFTIs with a minimum CGPA of 7.5 on a 10.0-point scale.
- Bachelor's degree holder in Engineering/ Technology from any Non CFTIs with at least CGPA of 7.5 on a 10.0-point scale with valid GATE score

(M.1.2) Research Scholar getting support from Government/Semi Government/Agencies (QIP, CSIR, UGC, DAE, DST, DBT, NBHM, JEST, ICCR etc.)

These candidates get fellowship from various Government / Semi Government schemes. The admission procedure and other requirements are same as applicable to Institute Research Scholars.

(M.1.3) Sponsored candidates/ External Registration Program:

These candidates are sponsored by recognized R&D organization, having R&D facilities, for doing research work in the institute on a full-time basis. These institutes should be recognized by DST and IIT Mandi, as R&D organizations. Some of them include National Laboratories, Reputed Universities / Colleges, or employed in research/analysis jobs in public sector / private sector / governments in the case of management area. Candidates applying under this category must have at least two years of work experience. These candidates will not receive any financial support from the institute.

Sponsorship letter **(Appendix A)** should be attached to the application form.

Candidates selected under this category can work at their parent institute, provided facilities are available and qualified personal are available at the parent organization. In such case, One guide is allotted from IIT Mandi and another from the parent organization.

Residential Requirement for Part-time/ERP candidates: There is desirable 16 weeks campus residential semester requirement to complete course work. However, DC can recommend completing courses (from IIT Mandi) via online mode. In such cases not less than 50% assessment of individual courses should be evaluated in offline mode. The residential requirement may be made flexible as courses are recommended partially in online mode. Hence, the scholars may be allowed to complete the residential semester requirement in multiple visits adding upto atleast 16 weeks on campus (i.e. equivalent to one semester). However, the minimum period of residency for each visit should not be less than 2 weeks.

In case of Part-time employed at radial distance in the range of 50-60 KM from IIT Mandi campus, the scholar will be permitted by the Dean (Academics) to complete course work without residential requirement as these scholars can be treated day-scholars.

(M.1.4) Research Scholar Supported from Project:

Student working under a project at IIT Mandi are eligible for this. They need to undergo the admission process, similar to the regular admissions or as declared by SRIC. Scholarship will be provided through project. The research scholar working in a project will be full time, provided her/his research for Ph.D. is related to the project as certified by the supervisor, who is associated with the project.

(M.1.5) Research Scholar Supported by Self or the Employer (Self-Sponsored):

This category refers to Ph.D. candidates with or without work experience and with good research / industry track record to join the doctoral program. Candidates without any research experience can also apply under this category. These candidates are admitted through the usual admission procedure. Students do not get any financial support from the institute. If admitted, these students have to complete their program without any financial support from the institute. Students cannot claim for the fellowship under this category. The qualifications may be same as that applicable for regular full-time admissions.

(M.2) International / Foreign Students

Candidates who are not citizens of India (by birth or naturalized) and /or are OCI/PIO card holders will be treated as foreign national and will consume the seats of foreign nationals. For fellowship, they should fulfil the requirement of the sponsoring agency/authority. They must meet minimum education requirements applicable for regular students. International students are expected to have working knowledge of English

(M.3) Indian Council for Cultural Relations (ICCR) Awardees (Foreign Students)

These students are sponsored by their respective governments and awarded scholarship by them. They should apply for admission through the Indian Embassy in their country.

(M.4) Quality Improvement Program (QIP):

Candidates, who are working in colleges, and financially supported by the parent institute fall under this category. On behalf of all institutes participating under QIP program, organizing institute advertises for admission under QIP category. The guidelines are as per the relevant notification issued time to time.

(M.5.) Part time Scholar:
(M.5.1) Institute Employee:

This category refers to Ph.D. applicants who are employees of IIT Mandi with more than 2 years of service remaining before their retirement. These candidates will not receive any financial support from the institute. **However, tuition fee may be waived off for candidates having gross family income not exceeding 8 lakhs in preceding financial year.**

(M.5.2) Research Scholar Supported from Project

Student working under a project are eligible for this. They need to undergo the admission process, similar to the regular admissions or as declared by SRIC. Scholarship will be provided through project. research scholar whose topic for Ph.D. is unrelated to the project will be working part time for Ph. D. but may be given full time status after the project tenure is completed.

(M.5.3) College Teachers (CT) /Candidates from Educational Institutes

Candidates under this category carry out research work during weekends, holidays and vacations, at IIT Mandi. After completing the fixed residential time at the institute, these candidates will be allowed to register for Ph.D. with a supervisor from the Institute (IIT Mandi). Candidates admitted under this category will be treated at par with Self Finance category as far as payment of fees and deposits are concerned. These candidates do not get any financial support from IIT Mandi. **However, tuition fee may be waived off for candidates having gross family income not exceeding 8 lakhs in preceding financial year.**

(M.6) Fellowship related Conditions:

Institute Teaching Assistantship (HTRA) Scholarships will be awarded as per the MHRD / or relevant authorities. On the recommendation of DC/APC, monthly fellowship may be continued till the completion of viva-voce or maximum period of 5 years (for Ph.D.), 6 years (I -PhD), whichever is earlier.

The above assistantship requires that the students must assist in teaching or research, as assigned by the institute, to the extent of 8 hours of work per week. The assistantship will be paid on the basis of monthly attendance and satisfactory performance in TAship and research related activities.

Above scholarship/fellowship amount are revised time to time by the concerned agencies *viz.,* MHRD/CSIR/UGC etc.

(M.7) Prime Minister Research Fellowship

The Prime Minister's Research Fellows (PMRF) Scheme has been designed for improving the quality of research in various higher educational institutions in the country. With attractive fellowships, the scheme seeks to attract the best talent into research thereby realizing the vision of development through innovation. The scheme was announced in the Budget 2018-19. The institutes which can offer PMRF include all the IITs, all the IISERs, Indian Institute of Science, Bengaluru and some of the top Central Universities/NITs that offer science and/or technology degrees. The candidates will be selected through a rigorous selection process and their performance will be reviewed suitably through a national convention.

For Eligibility and other criterion may visit : www.pmrf.in

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भारतीय प्रौद्योगिकी संस्थान मण्डी
Indian Institute of Technology Mandi

<p align="center">**Appendix-A**</p>

NO:………………………   **Dated:…………………..**

<p align="center">**Sponsorship Letter for Full-time Ph.D. Candidates**</p>
<p align="center">(To be typed on letterhead of the sponsoring organizaton)</p>

To

The Director,
Indian Institute of Technology, Mandi
Kamand-Himachal Pradesh-175075.

Dear Madam/Sir

Sub: Sponsoring of an Employee for Ph.D. programme

We hereby sponsor the candidature of Mr./Ms. _____ employed in our organization as _____ (designation) for joining his / her Ph.D. Programme in at your Institute as a <u>full-time</u> candidate.

He/ She is employee of our organization since_____. We shall bear the total expenses of his / her studies. We shall fully relieve him/ her of his/ her duties in the organization during the entire period of the Ph.D. programme, to enable him/ her to devote full time to his/ her studies in the Institute.

Signature and Seal of the Sponsoring Authority

Appendix B

No-Objection Certificate for Part-Time Students

(This should be typed on the letter head of the organization)

Reference No.   Date:

To,

The Director

Indian Institute of Technology Mandi,

Kamand Himachal Pradesh-175075

Sub: No-Objection Certificate

Dear Madam/Sir,

We have no objection if Mr./Ms. _____ an Employee in our organization as _____(designation), is admitted to the PhD programme in_____at your institute as a **PART-TIME** student.

It is certified that she/he is working is organization since_____and has completed minimum TWO YEARS of regular service in our organization/institute as an employee.

We shall grant him/her leave of absence to attend classes/research works at IIT Mandi during the PhD programme.

Signature and Seal of the Director/

Registrar/ Head of the Department

Appendix C

Reference No.   Dated:

No-Objection Certificate for Ph.D. under External
Registration Programme Students

(This should be typed on the letter head of the organization)

This is to certify that Mr./Ms._____ working as_____in our
organization_____since_____.

He /She intends to apply for the Certificate of Ph.D. under **External Registration Programme** at IIT
Mandi. The Organization does not have any objection to his/her applying for the programme.

The application of Mr._____ would be considered as per rules of **IIT Mandi**
for the above programme.

                                                            Signature and Seal of the Director/
                                                            Registrar/ Head of the Department

SCALING THE HEIGHTS

Indian Institute of Technology Mandi
Himachal Pradesh
India
Pincode: 175075
www.iitmandi.ac.in