# PROSPECTUS

# **Admission to**

# PH.D. PROGRAMMES

## (Rules & Procedures) \*



## **Academic Cell**

## NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH

### SECTOR – 26, CHANDIGARH – 160 019

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### JULY, 2021

## National Institute of Technical Teachers Training and Research, Chandigarh

### Ph.D. PROGRAMMES

(Rules & Procedures)

#### 1. Introduction

In 1967, the Ministry of Education, Government of India, on the recommendations of All India Council for Technical Education (AICTE), established four Regional Technical Teachers' Training Institutes (now National Institute of Technical Teachers' Training & Research, (NITTTR) at Bhopal, Chandigarh, Chennai and Kolkata in realization of the need for training better quality technicians to meet the large scale industrialization of the country. The institute at Chandigarh, started in collaboration with Royal Netherlands Government (upto 1974), was designed to meet the requirements of developing polytechnic education in the northern region covering the states of Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh, Uttrakhand, Delhi and Union Territory of Chandigarh. The institute during the last fifty years acted as a resource system to technical education and provided guidance at national, state and institution levels in policy formulation, planning and management, quality controls etc. The institute is registered under the Societies Registration Act, 1860 and is managed by a Board of Governors.

To achieve its stated objectives, the institute undertakes the following spectrum of activities: Education and Training Programmes; Curriculum Development; Instructional Material Development; Research and Development; Extension Services; Consultancy in Technical Education and Technology areas. Keeping in tune with the various emerging needs of the country, the institute presently extends its services in the following areas as well: Media Development including information resources, their acquisition, storage and retrieval; Entrepreneurship Development: Industry Institute Interaction: Continuing Education for working engineers/technicians; Rural development; Transfer of Appropriate Technology to rural areas; Integrating Persons with disabilities with the mainstream of Technical and Vocational Education.

Since 1992, the institute started offering Regular Master of Engineering Programmes in (i) Engineering Education and (ii) Manufacturing Technology. In the year 1994, two more programmes namely Master of Engineering in Construction Technology and Management and Computer Science and Engineering were added. In the year 1998, two more Master of Engineering Programmes in Instrumentation and Control and Electronics and Communication Engineeringwere added, and, since 2005, the institute started offering Master of Engineering Programmes on Modular mode in all the above disciplines. All these programmes, being offered for teachers of technical institutions and their administrators, professionals from industry, are duly approved by AICTE and affiliated to PU, Chandigarh.

In 2020, to keep pace with the latest technological advancements, the institute started three Specialized ME/M Tech programmes in emerging areas namely: M.E. in Computer Science and Engineering Specialization in IoT (Internet of Things), M.E. in Electronics and Communication Engineering Specialization in AI (Artificial Intelligence), and M.E. in Mechanical Engineering (Robotics). These three programmes are affiliated toJ.C BOSE University of Science and Technology, YMCA, Faridabad.

Since 2003, engineering colleges in the northern region have been brought under the purview of this institute as per the directions of Ministry of Education (the then MHRD). Since then, this institute has been conducting many short-term courses in various subjects for engineering college teachers in addition to catering to their other needs. The institute is organizing large number of

short-term courses for faculty of engineering colleges every year. In addition, the institute is also organizing induction training programmes and content based short term courses through ICT.

The status of the institute was elevated to a National Institute and renamed as **National Institute** of **Technical Teachers Training and Research on 18 November, 2003** with an objective to play larger role for the improvement of Technical Education in the country. **Director is the Executive Head (CEO) of the institute.** The institute has been ISO 9001-2015 certified.

The institute has been recognized as a 'Research Centre' by

- i) Panjab University, Chandigarh in 2007.
- ii) IK Gujral Punjab Technical University, Jalandhar (Punjab) in 2005.

#### iii) JC Bose University of Science and Technology, YMCA, Faridabad (Haryana) in 2020-21

for pursuing research work leading to the degree of Doctor of Philosophy (Ph.D.). At present, 84 candidates are pursuing their Ph.D. work in various disciplines under Faculty of Engineering & Technology & other Faculties of Panjab University, Chandigarh as well as IKG-PTU, Jalandhar. Out of 84 candidates, 40 candidates were admitted in Ph.D. programmes under QIP (Poly) scheme of AICTE, New Delhi. Two candidates of the institute are pursuing their Ph.D under other fellowships i.e. INSPIRE and NFST. As on date more than 50 candidates have already completed their Ph.D degree.

#### 2. Vision, Mission and Quality Policy of NITTTR, Chandigarh

#### VISION

• To be a lead resource institute for promoting excellence in technical education system.

#### MISSION

- To offer continuing education and training programs for the faculty and staff of the technical education system.
- To develop need-based curricula for technical education programs.
- To develop instructional material to enhance effectiveness of teaching-learning process.
- To undertake research and development in engineering & technology and technical education.
- To provide extension and consultancy services to technical education system.

#### QUALITY POLICY

NITTTR is committed to provide high quality and customize education, training, R &D and extension services to technical and vocational education system, industry and community. The institute shall develop leadership in technical teacher training and provide educational products and services to enable the technical education system to achieve excellence internationally.

#### 3. Objective of Ph.D. Programmes

The Ph.D. programmes are designed to prepare teachers from Engineering Colleges & Polytechnics, working engineers from Corporate Sector and scientists from R&D organization to enter their professional life with right perspective and breadth of knowledge related to their respective fields of specialization through enabling research experience during their stay in the Institute, thereby to develop high quality scientific and engineering specialists having strong base

of principles of science and the scientific methods, deep understanding of their chosen areas of specialization, the motivation to learn continually, interact with multi-disciplinary groups and dare to handle new challenges offered by the front-end technologies. Above all, the scholars should develop the capacity for free and objective enquiry, courage and integrity, awareness and sensitivity to the needs and aspirations of the society.

#### 4. Categories of Scholars

NITTTR Chandigarh offers Ph.D. Programmes under following categories:

- PhD under QIP (Engg.) Scheme (Full-time)
- PhD under QIP (Poly) Scheme (Full-time)
- PhD under Direct Admission Category (Full-time/Part-time)
- PhD under Industrial Fellowship (presently Full-time only for Electrical Engineering under M/s Typhoon HIL, Switzerland)

Note: Part-time candidates need to fulfil the minimum stay criteria of the degree awarding university.

The research scholars at NITTTR Chandigarh have the choice to enrol for PhD programmes under any of the following universities subject to approval of admission by the respective university.

- 1. Panjab University, Chandigarh.
- 2. IK Gujral Punjab Technical University, Jalandhar (Punjab)
- 3. JC Bose University of Science and Technology, YMCA, Faridabad (Haryana)

# The candidates have to comply with all the UGC regulations as accepted by the concerned university.

#### 4.1. Fellowships/Scholarships Available

PhD scholars admitted under QIP (Poly) and QIP (Engg.) schemes get scholarship of Rs. 15,000/per month for three years and a contingency grant of Rs. 15,000/- per annum for three years as per AICTE rules

Full-Time scholars admitted under direct admission scheme can apply for various fellowship schemes like INSPIRE, CSIR, AICTE, Minority community fellowship and other such schemes.

PhD scholars admitted under M/s Typhoon HIL, Switzerland Sponsored fellowship scheme get scholarship of Rs. 28,000/- per month for three years' subject to performance review in every six months.

#### 4.2. Disciplines/ Branches and Number of Seats offered

The Disciplines/ Branches offered for PhD programmes at NITTTR Chandigarh are as per the following details:

- <u>For PhD under Direct Admission Scheme:</u> Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering, Management\*, and Applied Sciences\*\* (Physics, Mathematics).
- For PhD under QIP (Poly) and QIP (Engg.) Schemes: Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering
- <u>PhD under Industrial Fellowship (Presently under M/s Typhoon HIL, Switzerland):</u> Electrical Engineering

The number of PhD seats in any branch/ discipline under direct admission category is decided as per the availability of the supervisor(s) in that particular branch/ discipline. There are 20 seats

under QIP (Engg.) Scheme and 16 seats under QIP (Poly) Scheme. There is 01 seat under M/s Typhoon HIL, Switzerland Fellowship.

\*Management Discipline is offered only under IKG-PTU Jalandhar and JCBUST, YMCA, Faridabad

\*\*Applied Science Discipline is offered only under JCBUST, YMCA, Faridabad

#### 5. Admission to Ph.D. Programmes

Applications are invited from candidates for all categories of scholars by advertising the Ph.D. programmes admission notice on NITTTR Chandigarh website (www.nitttrchd.ac.in) and/or in the leading newspapers from time-to-time. However, admission to Ph.D. is also possible any time during the year through institute's Academic/Research Degree Committee with the approval of the Director, NITTTR, Chandigarh for direct admission category of scholars.

The admission process of QIP (Engg.) scheme is coordinated by the Principal Coordinator, QIP (Engg.), IIT Guwahati, Guwahati-781039, Assam. Candidates interested in taking admission in PhD programme under QIP (Engg.) scheme at NITTTR Chandigarh need to apply online by visiting <u>https://www.iitg.ac.in/cet/qip.html</u>

Admission to the Ph.D. programmes under Direct admission and Typhoon HIL, Switzerland Fellowship categories shall be made on the basis of merit prepared on the basis of (i) presentation and/or interview conducted at the Institute and (ii) B Tech/M.Tech marks. In case of QIP (Poly) and QIP (Engg.) Schemes, the admission shall be made on the basis of selection criteria prescribed in the information brochure of respective scheme available at NITTTR Chandigarh website.

Institute's Academic/Research Degree Committee will assess the eligibility of candidates and recommend them for enrolment/registration to the university. Then the candidates are required to fill-in the application form (enclosed in the Ph.D. Brochure of the concerned university) for enrolment/registration. All regulations and rules for the degree of Doctor of Philosophy of the concerned university will be followed.

Candidates interested in admission under direct admission scheme also need to apply and qualify the Ph.D. Entrance Examination as per the schedule available on degree awarding university website. Candidates who have cleared GATE/NET/ other such national fellowship tests are exempted from appearing in the PhD entrance examination.

#### 6. Eligibility Criteria for Ph.D. Admission

The minimum eligibility criteria for all categories of scholars are listed as follows. Candidates are advised to read the PhD rules and regulations of the degree awarding university for detailed eligibility criteria.

#### PhD under Direct Admission Scheme:

- Relevant Master's degree or equivalent with minimum marks/CGPA as per degree awarding university
- Qualified Ph.D. Entrance Examination of degree awarding university or GATE/NET/ other such national fellowship tests
- Teachers/ working engineers/ fresh Master's Degree holders are eligible.

#### PhD under QIP (Poly) Scheme:

 Only permanent faculty members of AICTE recognized polytechnic (Govt./ Govt.-aided/ Self-financing) can apply.

- Minimum teaching experience of 3 years as on the prescribed date.
- Master's Degree or equivalent (minimum qualification) in the appropriate branch and other eligibility criteria prescribed as per QIP (Poly) Scheme information brochure.

#### PhD under QIP (Engg.) Scheme

- Only Full-time regular/permanent faculty members of AICTE recognized Degree-level (Govt./ Govt.-aided/ Self-financing) engineering institutions can apply.
- A minimum teaching experience of 3 years at BE/B.Tech level in an AICTE approved Engineering institution/NIT on the prescribed date.
- A Master Degree or Equivalent in an appropriate branch and other eligibility criteria prescribed as per QIP (Engg.) Scheme information brochure.

#### PhD under M/s Typhoon HIL, Switzerland Industrial Fellowship

• ME/M.Tech in Electrical Engineering with CGPA 7.0 or above and a valid GATE Score

#### NOTES:

- For admission under direct admission category, candidates should first appear in the Entrance Test either by Panjab University, Chandigarh or IKG Punjab Technical University, Jalandhar or JC Bose University of Science and Technology, YMCA, Faridabad or before applying to the institute. Candidates who have cleared GATE/NET/ other such national fellowship tests are exempted from appearing in the PhD entrance examination. Candidates should apply for admission on the prescribed form which is enclosed with Ph.D. information brochure, duly filled in their own handwriting along with qualifying/exemption certificate of Ph.D. Entrance Test.
- 2. Sponsorship letter (in case of QIP schemes) should include an undertaking stating that the period of study will be treated as 'on duty' with usual salary, and he/she will be relieved for the period of studies, and, all fees will be paid by the candidate/organization as per institute rules.
- 3. Full Time candidates as well as Part-time candidates (check rules and regulations of concerned university in respect of Part-time candidates) are required to submit a "No Objection Certificate" at the time of interview from their employers stating that the candidate is permitted to pursue studies on a Full-Time / Part-time basis and that
  - his/her official duties permit him/her to devote sufficient time for research.
  - he/she will be fully relieved from duty and permitted to reside at the Institute for a period as per university requirement during his/her registration for the degree.
- 4. The relevancy/equivalency of ME/MTech degree for admission to a given discipline will be defined/determined by the concerned university.
- 5. Admission is subject to vacancy with each supervisor/guide being available in the relevant specializations.
- 6. Candidates must be medically fit and must bring along with them a medical fitness certificate signed by Gazetted Medical Officer at the time of joining PhD programme.
- 7. The interview/presentation for the admission will be held by the Ph.D. Academic/Research Degree Committee of the institute in the office of the Director.
- 8. In case a student leaves the Institute without completing the Ph.D. programme, he/she will be refunded only the Institute security/caution money. All outstanding dues will, however, be recovered before such refund is made.
- 9. The Institute reserves the right to alter the schedule of admission, fee structure, financial incentives to candidates if considered, necessary.

#### 7. Ph.D. Candidature

A student shall be awarded the Ph.D. candidacy on completion of the following requirements:

- An Internal Academic/Research Degree Committee of the institute shall consider each application, assess the eligibility of candidates, interview them at the time of enrolment.
- The candidates' enrolment/registration applications (as per university format) along with the recommendation of the committee will then be submitted to the university.
- The candidate must qualify Ph.D. course work of one/two semesters as per rules and regulations (minimum standards and procedure for award of Ph.D.) of the concerned university.
- A student must present a State-of-Art seminar to delineate the current state of knowledge about the specific problem related to which he/she wants to pursue research. The presentation should include the objectives and literature survey of the specific problem, the methodology that he intends to use to conduct the research. This will be an open seminar. The Academic/Research Degree Committee will assess the suitability of the proposed topic/problem for research before submitting to the university for registration. The committee will, on acceptable presentation, certify the fulfilment of these requirements. The candidate will submit one hard/soft copies of the synopsis of his/her research project for consideration by RDC & Research Board of degree awarding university in the prescribed time limit.
- Candidates are advised to visit the website www.nitttrchd.ac.in regularly for updates.

#### 8. Monitoring Process

After the candidate is granted Ph.D. Candidature, the progress of the research work will be continuously monitored through presentations / progress reports before the concerned Academic/Research Degree Committee of the institute on a prescribed proforma to be sent by the supervisor to the RDC of the university.

#### 9. Open Pre-Submission Thesis Seminar

There will be an open presentation of the work done by the candidate before the thesis is bound and submitted for evaluation to the university. The Academic/Research Degree Committee of the institute may recommend modification for extending the work required before the thesis is completed. A certificate from the supervisor stating that all modifications, if any, recommended by RDC have been incorporated, the research work being reported is the original contribution of the candidate and the work has not been presented anywhere else for the award of any other degree. The pre-submission seminar is subject to publication/acceptance of at least one paper in SCI/SCIE Journals.

#### **10. Submission of Thesis**

A thesis may be submitted after a minimum period as per the university norms subject to publishing or acceptance of one paper in SCI/SCIE Journals. The thesis must strictly fulfil all the requirements on the format prescribed by university. The candidate shall submit required number (as per university norms) of hardbound copies of the thesis for evaluation by the university.

#### 11. Thesis Evaluation

Thesis will be evaluated as per the norms of Panjab University, Chandigarh or IKG PTU, Jalandhar or JC Bose University of Science and Technology, YMCA, Faridabad (Haryana). To evaluate the Ph.D. thesis, a panel of 06 professors/readers will be proposed by the supervisor of the candidate from amongst IISc, IITs, NITs or universities and establishments abroad (Optional in case of Panjab University, Chandigarh). The panel should be duly recommended by the Head of the

Department and sent to the Director for his approval/ addition/ deletion. For further details, see the concerned university norms.

#### 12. Viva-voce Examination

Based on reports from the examiners of Thesis evaluation, the external examiner will examine the candidate through an open Seminar/Viva Voce for the award of the Ph.D. degree in accordance with the rules prescribed by the university. For further details, see the concerned university guidelines.

#### 13. Duration

The minimum duration of the Ph.D. will be 3 years from the date of enrolment/registration subject to a maximum period of 5 years. The extension beyond this period can be granted on the approval of the Director of the institute and by the Vice Chancellor of the concerned university. For further details, see the concerned university guidelines.

#### 14. Academic/Research Degree Committee

The institute will constitute an Internal Academic/Research Degree Committee in each discipline of engineering, viz., consisting of Mechanical Engineering, Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics & Communication Engineering, Engineering Education, Management and which shall consist of

- a) Director
- b) Head of the Department
- c) Dean (Academics, Research and Development)
- d) Senior Most Professor of the Institute
- e) Senior Most Professor of the Concerned Deptt.
- f) Coordinator Academic Cell
- g) Co-ordinator for Ph D Programme
- h) External Expert nominated by the Director

The committee shall consider each application, assess the eligibility of candidates, interview them at the time of enrolment at the institute. The candidates' enrolment/registration applications (as per university format) along with the recommendation of the committee will then be submitted to the university. The Research advisory/degree committees for the PhD scholars shall be constituted as per degree awarding university guidelines.

#### 15. Fee Structure for Ph.D. Students

Admission Fee (One-Time at Admission only)	Rs. 5,000/-
Tuition Fee (Per Semester)	Rs. 7,500/-
Other facilities/services (library/internet/welfare/development etc. (Annual)	Rs. 4,000/-
Security (Refundable)	Rs. 7,000/-
Synopsis presentation & Final University Exam activity (to be charged separately)	Rs. 5,000/- per
Continuation Fee (after three years from date of admission) annum	Rs. 10,000/- per

Hostel/Mess Charges extra as per rules

Students will deposit University's enrolment/registration, migration fee (if any), annual charges and thesis submission fee etc. as per university's norms separately to the concerned university.

#### 17. Research Areas Offered:

The Institute offers research programmes leading to the degree of Ph.D. in the following areas:

#### Discipline of Mechanical Engineering (Manufacturing Technology)

3D/4D and 5D printing; Heat Transfer; Energy Conservation and Management; Bearing &Lubrication; Computer-Aided Design & Manufacturing; Industrial Engineering; Robotics Mechatronics and Manufacturing Technology; Operations Research; Production & Materials Management; Quality, Reliability, and Maintenance; Productivity Management; Ergonomics; Total Quality Management; Business Process Reengineering; Enterprise Resource Planning.

#### **Discipline of Civil Engineering (Construction Technology & Management)**

Structural Engineering, Geo-technical Engineering, Transportation Engineering, Concrete Technology, Construction Engineering and Management, Environmental Engineering, Computer Aided Design and, Applications, Rehabilitation/Maintenance of Civil Engineering Structures.

#### **Discipline of Computer Science & Engineering**

Network & Information Security, Image Processing, Artificial Intelligence, Wireless Networks, Distributed Computing, Cloud computing, Mobile Adhoc Networks, Wireless Sensor Networks, Vehicular Adhoc Networks, Internet of Things, Fog/Edge Computing, Data Science..

#### Discipline of Electrical Engineering (Instrumentation & Control)

Power System Operation & Control; Power Electronics, Electrical Machines & Drives; Computer Aided Analysis of Power Systems; Process Control & Instrumentation, Applications of artificial Intelligence Techniques in electrical engineering, Biomedical Instrumentation and Biometrics, energy management.

#### **Discipline of Electronics & Communication Engineering**

Soft Computing, Image Processing, Digital signal Processing, Coding, Antenna, Microwave, Optimization Techniques, Neural Networks, Video, Mobile Communication, Optical/Satellite Communication, MEMS, Bio-medical Signal Processing and other area of Electronics & Communication Engg.

#### **Discipline of Management**

Entrepreneurship Development and Small Enterprises Management, Total Quality Management, Marketing Management, Human Resource Management, Financial Management, Knowledge Management, Management Information System, Disaster Management, Rural Development, Appropriate Technology, Climate Change & Sustainability Development, Green Technology, Management of Disabilities and Himalayan Studies etc.

#### **Discipline of Applied Sciences**

Thin Films, Nano-materials, compound semiconductors, Fiber Optics, Nuclear Radiations, Photonics, Nano-photonics, Laser Technology, Nanotechnology enabled energy devices, Energy harvesting, Energy storage, Ferrites, non-crystalline semiconductors, Mathematical Programming, Operations Research, Soft Computing Techniques.

#### NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH, SECTOR-26, CHANDIGARH – 160 019

#### Application Form for Admission to Ph.D. PROGRAMMES

(for PhD enrolment under Direct-admission / Industrial Fellowship Schemes)

DD/Online Transaction of Rs. 5,000/-DD/UTR No.: Date To be filled by the Office Application No.

#### Discipline for which Admission to Ph.D. is sought (Please TICK the appropriate option)

Whether Full Time or Part Time

From: PU Chandigarh or IKG-PTU Jalandhar or JCBUST, YMCA, Faridabad

Mechanical Engineering (Manufacturing Technology)/ Civil Engg. (Construction Technology & Management) / Computer Science & Engineering / Electrical Engg. (Instrumentation & Control)/ Electronics and Communication Engineering/ Applied Sciences / Management

#### Please read the prospectus carefully before filling each item of the Application Form.

1) Name (Block letters):

2) Marital Status: Married/Unmarried Gender (Male/Female):

3) Father's Name: 4) Mother's Name:

(Please write your name as well as names of your father & mother as per Degree/DMCs of your qualifying examination)

5) Address for Correspondence:

6) Phones/Email: (Landline) (Mobile) Email

7) Official Address:

8) Sponsoring Institute/Organization:

9) Belongs to SC/ST /Physical Handicapped/OBC category (Tick Mark and attach certificate):

10. Educational and Technical qualification (10<sup>th</sup> and UG Degree onwards, attach self-attested copies of certificates)

S.No.	Examination	University/ Board	Year	Roll No.	Max. Marks	Marks obtained
10th						
B.Tech / BE / BBA /						
BA / Relevant						
Bachelor Degree						
M.Tech / ME / MBA						
/ Relevant Master						
Degree						
Any other						

NOTE: In case the result is declared in Grade Points, an authenticated copy of the formula for conversion to percentage of marks should be attached.

Grade:

Converted to percentage:

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11. Teaching and practical experience (in chronological order) after acquiring entry qualification (attach certificate)

	Sr.No.	Name of Institute/ Organization & address	Period (with date)		Designation	Nature of Duties
			From	То		
Tot	al experie	ence (as on the last date of	application):	YY	M	D

12. List of Research Papers/Books Published (if any)


I certify that the entries made by me in this form are correct to the best of my knowledge and I have not suppressed any information in any manner. I agree to observe and abide by all the rules & regulations of the NITTTR, Chandigarh and the affiliating university that may be laid down from time to time during the period of my studies and not to associate myself with any activity prejudicial to the discipline of the institute

Place:

Date:

Signature of applicant

#### **RECOMMENDATIONS OF THE SPONSORING AUTHORITY**

Certified that the particulars given by Mr./Ms		_ S/o / W/o / D/o	
	are correct to the best of my knowledge.	He/She is being	
sponsored for admission to Ph.D. programme in	the discipline		
Date:	Signature		
Place:	Name:		
	Designation:		
	Address of Sponsoring (with Seal/Office Stamp	))	
13. Consent of the proposed Supervisor(s)			

Name & Designation:

Signatures

1.

2.

Candidates are advised to send the Ph.D. Application Form (complete in all respect along with copies of testimonials and demand draft of Rs. 5,000/-) to The Director, National Institute of Technical Teachers Training & Research, Sector 26, Chandigarh – 160 019