

**M.S (Research)/Ph.D. Admissions  
Information Brochure  
July 2021 Intake**

भारतीय प्रौद्योगिकी संस्थान तिरुपति



***INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI***

***TIRUPATI - 517506***

## **Important Dates**

Opening date for online application	29.03.2021 (Monday)
Closing date for online application	03.05.2021 (Monday)
Written Test/ Interview	<b>23.05.2021 to 23.06.2021</b>
Announcement of Results	Next Day of the Interview
Joining date of the selected candidate	26.07.2021 (Monday)

### **Important Note**

An appropriate decision will be taken by the Dean (Academics) for specific cases which are not covered or made clear in this document, after careful examination. His/her decision on the matter will be final.

## Important Guidelines for Ph.D. & M.S. (Research) Application

- Please read the instructions given in the admission brochure carefully before filling the application form.
- Online application form is available on the Institute's website <http://admissions.iittp.ac.in/>. After filling the form, please take a printout and keep it for record purpose
- **The application fee is as follows:**

GN/EWS/OBC-NCL Male candidates	: Rs.100/-
GN/EWS/OBC-NCL Female candidates	: Rs.50/-
SC/ST and PwD candidates	: Rs.50/-
- Application Fee is Non-refundable. Application fee is payable through SBI Collect only. ([Click here to pay](#)). Please ensure to save the payment reference number.
- A candidate can apply to more than one research area. The maximum number of research areas to which he/she can apply will be three.
- Candidates called for written test/interview must bring with them printed copy of the application that they submitted online along with originals and photocopies of the relevant certificates.
- Reservation/concession/relaxations for EWS/ OBC/ SC/ ST/PwD and Kashmiri-Migrants (KM), including Kashmiri Pandits/Kashmiri Hindu Families: As per the Government of India rules. A valid OBC-NCL/ST/SC/EWS/PwD Certificate must be uploaded with the ONLINE application and submitted at the time of admission.
- Statement of Purpose (SoP) should be prepared in the format as mandated by the respective department. The details are given in Para (7) of this document.
- Candidates must submit all the self-attested copies of the relevant certificates as specified in Para (8) on or before 26.07.2021, failing which admission will stand cancelled.
- Please make all files ready with following format and size before going to file upload:
  1. Passport size Photo (Dimension 3.5cm X 5cm) (jpg, jpeg), Size <=1024 KB)
  2. Signature (Dimension 5cm x 1.5cm )( format jpg, jpeg) each size <= 1024 KB)
  3. Qualifying UG Degree Certificate(jpg, jpeg) size <=1024 KB)
  4. Qualifying PG Degree Certificate(jpg, jpeg) size <=1024 KB)
  5. Gate Score Card(jpg, jpeg) size <=1024 KB)
  6. National Level Exams in single pdf (pdf) each size <= 1024 KB)
  7. Community Certificate if applicable (jpg, jpeg) each size <= 1024 KB)
  8. Experience Certificate(pdf) size <=1024 KB)
  9. SoP(pdf) size <=1024 KB)
- Please visit the institute's website regularly for important announcements and results.

## 1. The Institute

Indian Institute of Technology Tirupati (IIT Tirupati) is incorporated under the Institutes of Technology Act, 1961 and having its temporary campus at Renigunta Road, Settipalli Post, Chittoor District, Andhra Pradesh - 517506 and permanent campus at Yerpedu-Venkatagiri Road, Yerpedu Post, Chittoor District, Andhra Pradesh-517619. It is the first among the 3rd phase of Indian Institutes of Technology, announced in 2014, to have its foundation stone laid in March 2015. IIT Tirupati started functioning with the support of its mentoring institute, IIT Madras, from the academic year of 2015-16. IIT Tirupati is currently offering the programmes – B.Tech, M.Tech, M.Sc, M.S(Research) and Ph.D. IIT Tirupati has nine departments – Civil & Environmental Engineering, Computer Science & Engineering, Electrical Engineering, Mechanical Engineering, Chemical Engineering, Mathematics & Statistics, Physics, Chemistry and Humanities & Social Sciences. The pedagogy is aimed at nurturing innovation, creativity, quality, teamwork, communication skills, ethics, and societal interaction.

## 2. Categories of Admission

M.S.(Research)/Ph.D. admissions are made under two categories:

- a. Regular (Full-time scholars) - Under regular registration a scholar can be selected under 1) Institute HTRA, 2) fellowships from CSIR/UGC/INSPIRE etc. and 3) Project funding.
- b. External - Research scholars under the external registration programme, sponsored by and employed in industry/organisation/national laboratories having R&D facilities and recognition by DST or by IIT Tirupati. A Research Scholar under the external registration programme will normally carry out part or all of his/her research work in the industry/organization/national laboratory employing the scholar under the supervision of a co-guide employed in the same organization and a guide at IIT Tirupati. The candidate must have at least two years' experience in the parent organization.

## 3. Research Areas

**Note: Prospective candidates are required to select the research areas on the online portal as per the availability in the respective category/scheme. Research areas selected other than those available in the respective category/scheme will not be considered.**

### 3.1 Ph.D.

#### ***A) Chemical Engineering:***

Process Control and Optimization, Machine Learning in Process Systems, Multiphase systems and Microfluidics, Advanced Separation Technology, Food Science and Technology, Colloids and Interfaces, Nanomaterials, Catalysis

#### ***B) Computer Science & Engineering:***

Parallel Computing, Reinforcement Learning, Data Science Algorithms and Applications, Computer Networks, ML for IoT, AI Accelerator, VLSI Test & Verification, and Software Engineering

***C) Civil and Environmental Engineering:***

1. Geotechnical Engineering
2. Water Resources Management \*
3. Air quality modeling and management / Environmental Life Cycle Analysis\*
4. Water and wastewater treatment engineering \* - (*only project positions*)
5. GIS and Remote Sensing (*only for UGC NET qualified candidates with JRF.*)

\*' UGC NET qualified candidates with JRF may also apply for PhD.

***D) Electrical Engineering:***

**Regular Candidates:**

Power Engineering and Smart Grids, Power Electronics and Drives, Semiconductor Devices & Nanoelectronics, RF and Microwave Engineering, Wireless Communication and Networking, Embedded Systems

**External Candidates:**

Power Engineering and Smart Grids, Power Electronics and Drives, Semiconductor Devices & Nanoelectronics, RF and Microwave Engineering, Wireless Communication and Networking, Embedded Systems

***E) Mechanical Engineering:***

**Regular Candidates:**

**Fluids and Thermal:** Theoretical and Computational Fluid Mechanics, Heat Transfer, Refrigeration and Air-Conditioning, Sprays and Combustion, Energy Storage

**Solid Mechanics:** Computational Mechanics, Composites, Plasticity and phase transformations.

**Manufacturing:** Additive manufacturing, Dynamic and high temperature deformation of alloys, Advanced Manufacturing, Micro and Nano Manufacturing, Smart Manufacturing, Machining,

**External Candidates:**

**Fluids and Thermal:** Theoretical and Computational Fluid Mechanics, Heat Transfer, Refrigeration and Air-Conditioning, Renewable Energy, Sprays and Combustion, Energy Storage, Turbomachines

**Solid Mechanics:** Computational Mechanics, Composites, Plasticity and phase transformations, Dynamics and Vibrations

**Manufacturing:** Additive manufacturing, Dynamic and high temperature deformation of alloys, Advanced Manufacturing, Micro and Nano Manufacturing, Smart Manufacturing, Machining, Metrology

***F) Physics:***

Experimental Atomic, Molecular and Optical Physics - Quantum communication, Quantum Optics, Precision laser spectroscopy, Laser cooling, Ion trapping, Cavity ring down spectroscopy.

Theoretical and experimental plasma physics, plasma mediated processing for wastewater treatment, agriculture and food processing, quantum-mechanical many-

body calculations, fine-structure resolved plasma modelling, emission spectroscopy, precision laser absorption spectroscopy, ion trapping and simulation, evaporative cooling of molecular ions.

### ***G) Chemistry:***

- **Organic Chemistry:** New methods of development for sustainable organic synthesis by transition metal catalysis; electro- and photo-redox catalysis; C-X (X = H, C, O, N) bond activation.
- **Bioinorganic/Environmental/Medicinal Chemistry:** Development of functional models (enzyme mimics) of novel enzymes relevant to the environment and energy; understanding the detoxification mechanism of arsenic and mercury-related compounds in the cellular system, production of natural gases like methane, ethane by functional models; Coordination & Supramolecular Chemistry; Development of inhibitors of metalloenzymes for therapeutic applications.
- **Theoretical and Computational Chemistry:** Stochastic thermodynamics; Polymer Translocation; Stochasticity in Biochemical processes; Chemical Dynamics and Spectroscopic Modelling; Statistical Mechanics; Quantum chemical modelling of functional molecules and low-dimensional materials.

Note:

- ❖ Institute fellowship is available only for the following research areas: Chemical Dynamics and Spectroscopic Modelling; Statistical Mechanics; Quantum chemical modelling of functional molecules and low-dimensional materials.
- ❖ Ph.D. aspirants having qualified for CSIR/UGC-JRF, Inspire and or having any other external fellowships are encouraged to apply.

### ***H) Mathematics and Statistics***

Analysis of Fractals, Environmental / Spatio temporal / Geo Statistics, Statistical Finance  
***(only for UGC-CSIR/NET-JRF/INSPIRE/NBHM or any other external fellowship qualified candidates with JRF and External Category)***

### ***I) Humanities and Social Sciences***

Political Philosophy, Ethics, Contemporary Indian Thought ***(only for UGC-JRF or any other external fellowship qualified candidates with JRF)***

## **3.2 M.S.(Research)**

### ***A) Chemical Engineering:***

-- same as Ph.D. --

### ***B) Computer Science & Engineering:***

Parallel Computing, Algorithms and Data Structures, Reinforcement Learning, Data Science Algorithms and Applications, Computer Networks, ML for IoT, Computational Complexity, AI Accelerator, VLSI Test & Verification, Software Engineering and Computing for Education.

***C) Civil and Environmental Engineering:***

1. Structural Engineering - Experimental and Computational Solid Mechanics, Structural Concrete, Nondestructive Testing, Structural Health Monitoring, Structural Rehabilitation & Retrofitting
2. Geotechnical Engineering
3. Water Resources Management
4. Air quality modeling and management / Environmental Life Cycle Analysis
5. Water and wastewater treatment engineering – (*only project positions*)

***D) Electrical Engineering:***

**Regular Candidates:**

Medical Image Processing, Power Engineering and Smart Grids, Power Electronics and Drives, Semiconductor Devices & Nanoelectronics, Wireless Communication and Networking, Embedded Systems

**External Candidates:**

RF and Microwave Engineering

***E) Mechanical Engineering:***

-- same as Ph.D. –

**4. Eligibility:**

**4.1 Ph.D. in Engineering**

- (a) Candidates with a Master's degree in Engineering/Technology or a Master's degree by Research in Engineering/Technology with a good academic record.  
OR
- (b) Candidates with Master's degree in Sciences with a good academic record and of exceptional merit are eligible for the relevant Engineering discipline. They should have a valid GATE score or UGC/CSIR-NET/NBHM/JEST or equivalent qualification in the relevant area tenable for the year of registration.  
OR
- (c) Candidates who have qualified for the award of Bachelor's degree in Engineering/Technology from a Centrally Funded Technical Institute (CFTI) with an exceptionally good academic record in an eligible discipline will be considered for direct admission to Ph.D. provided he/she has a minimum CGPA of 8/10.

**4.2 Ph.D. in Sciences**

- (a) Master's degree in Sciences with a good academic record and having a valid score in GATE or CSIR UGC NET JRF & LS Exam/NBHM/INSPIRE/JEST or equivalent qualification tenable for the current year in the relevant area. Master's degree holders in Engineering/Technology are also eligible.  
OR
- (b) ME/M.Tech or MS by Research in Engineering or 2 year M.Sc from IITs (entry through JAM) with CGPA of 8/10 and above. BS+MS (5 years integrated) from CFTI is also accepted.  
OR
- (c) Candidates who have qualified for the award of Bachelor's degree in Engineering/Technology from a Centrally Funded Technical Institute (CFTI) with an exceptionally good academic record in an eligible discipline will be considered for direct admission to Ph.D. in Sciences provided he/she has a minimum CGPA of 8/10 and they can be offered HTRA, if selected.

### **4.3 Ph.D. in Humanities and Social Sciences**

Master's degree in an eligible discipline with a good academic record or equivalent and having a valid GATE score or UGC/CSIR- NET/NBHM or equivalent qualification tenable for the current year in the relevant area.

### **4.4 M.S. (Research)**

(a) Candidates with a Bachelor's degree in Engineering/Technology/MCA/M.Sc. in the relevant departments with valid GATE score.

OR

(b) Candidates having Associate Membership of the following professional bodies are also eligible for admission to the M.S. programme of their parent discipline provided they have a valid GATE score and have passed both part A and part B of the Membership examinations with a good academic record: The Institution of Engineers (India) (Civil/Mechanical/Electrical and Electronics/Electronics and communications), The Institute of Electronics and Tele-Communication Engineering.

OR

(c) Engineering graduates from IITs and other Centrally Funded Technical Institutes (CFTI) with a CGPA of at least 8/10 are eligible for seeking admission, without GATE score, to the MS Programme and they can be offered HTRA, if selected.

OR

(d) Candidates under External Registration should have the same qualification as in (a) however, valid GATE score is not required.

## **5. Financial Assistance:**

Assistance will be as per MoE norms. Fulltime Scholars admitted to Ph.D. and M.S. programmes are eligible for the Half-time Research Assistantship (HTRA) for which:

(a) They should work for 8 hours per week for the Institute to earn this assistantship. The work would normally involve assistance in teaching/research, and will be assigned by the Institute.

(b) Renewal of assistantship every semester will be contingent on enrolment, satisfactory progress in research work and good performance during the preceding semester in the discharge of responsibility as teaching/ research assistant.

(c) Candidates selected under Project funding scheme are required to work in the sponsored area of research.

Other scholarships like UGC-JRF, CSIR-JRF, ICMR & AICTE etc. may also be available for those admitted candidates who have qualified for the respective schemes and the amount of fellowship will be as per the norms of the funding agency.

## **6. Selection Procedure:**

The Selection Committee will call eligible candidates possessing the minimum educational qualifications and satisfying additional and stiffer criteria set from time to time, for an interview and/or written test.



Based on the academic record and the performance of the candidates in the interview and/or test, the Selection Committee will recommend to the Chairman, Senate the names of candidates found suitable for admission.

## 7. Format for Statement of Purpose:

A) **Chemical Engineering** (to be uploaded as a single pdf file)

1. What motivates you towards pursuing a doctoral degree? (max 200 words)
2. Describe your research interests in your area of specialization. (max 300 words)
3. Identify a research problem in your area of specialization that you believe is worth investigating. State the objectives, explain their importance and the current research status. Limit to a maximum of 500 words, two figures and five references.

B) **Computer Science and Engineering** (Strictly in 2-page in Font: Times New Roman, 11 size. It will be disqualified in case it fails to pass through plagiarism check.)

First page: One-page summary of the M. Tech. (B. Tech., in the case of MS applicants) project work: This can be a graphical abstract with the use of flowchart, block diagram or results etc. and explaining the novelty, contributions, and key features of the project work.

Second page: SOP containing the following:

1. Why do you want to do PhD / What motivates you for PhD? (only for Ph.D.)
2. Specify three research interests from the advertised areas in the order of priority.
3. Explain what motivates you to do research in these fields.
4. Specify a research problem that you would like to attempt (if any).
5. Provide your achievements/awards/publications (if any)

C) **Civil and Environmental Engineering**

What motivates you towards pursuing a doctoral degree/MS(R) degree? (Max. 200 words)

Describe your research interests in your area of specialization. (Max. 300 words)

Explain briefly the tentative research plan by using schematics, figures, flowchart and relevant references. (Max 500 words)

D) **Electrical Engineering** (The proposal is strictly a 2-page in Font: Times New Roman, 12 size. It will be disqualified in case it fails to pass through plagiarism check.)

1. One page summary on their M.Tech project work (This can be a graphical abstract with use flowchart, block diagram or results etc. and highlighting contributions or salient points of their work)
2. Other page is for SOP with
  - a. Brief academic background
  - b. Why you want to do PhD / What motivates you for PhD
  - c. What motivates you to do research in the field and what you like to focus on or interests you in that field.

E) **Mechanical Engineering** (Attached as Annexure-1)

F) **Physics** (Attached as Annexure-1)

G) **Chemistry**

What motivates you for pursuing a doctoral degree? (Max 200 words)

Briefly describe your research interests? (Max 300 words)

Summarise your previous research experiences (if any). (Max ten lines for each projects)

H) **Mathematics and Statistics** (Suggestive but not restrictive guideline: Write about followings in few paragraphs preferably. It need not be a lengthy essay but essential information combined. Please do not write unnecessary information.)

- This is introduction for the topic/research area/domain. I want to do research on.
- Why and how it interests me.
- Relevant course work done in past.
- Relevant software I have used for programming, writing documents/articles.
- Any other experiences or exposures or activities (example prior experience through job, conference, participation in academic contest) from past that can have impact.
- Why and how this choice of research I expect to impact me in my future.
- How it can contribute towards community/society.

**I) Humanities and Social Sciences** (SoP not required)

## **8. Original Documents to be submitted for Verification**

### **8.1 At the time of Interview and/or Written Test:** (Scanned Copies in a single PDF)

- a) Copy of application submitted.
- b) All the semesters Mark sheet/grade card / provisional / degree certificates beginning from first degree towards proof of qualification and all other educational qualifications (SSC/ 10<sup>th</sup> onwards)
- c) Community Certificate in the case of SC/ST/OBC-NCL/EWS candidates issued by the respective State Government.
- d) Authorised Doctor's Certificate with disability descriptions in the case of Person with Disabled (PwD) candidates.
- e) Copy of GATE score or CSIR-UGC-JRF/LS/NET/DAE-JEST or other fellowship award.

### **8.2 At the time of Admission:** (Scanned Copies in a single PDF)

- a) Offer of admission.
- b) Birth Certificate.
- c) Aadhar No. & PAN No.
- d) First page of SSLC/SSC/Matriculation certificate
- e) Copy of the submitted application form.
- f) Original GATE Score Card or CSIR-UGC-JRF/LS/NET/ DAE-JEST or other fellowship award letter.
- g) Degree certificate/Provisional/Course completion certificate/Grade Cards/Mark sheets of all the semesters of degrees obtained.
- h) SC/ST/EWS/OBC-NCL community certificate for the candidate belonging to SC/ST/EWS/OBC-NCL category. [OBC-NCL scholars to bring a Non-creamy layer community certificate valid at the time of admission].
- i) Relieving order/Resignation acceptance letter from the employer in the case of fulltime candidates, if employed.
- j) Relieving letter, NoC/Permission and Consent of co-guide from the parent organisation in case of external candidates. (The format of the three documents is attached as Annexure-II)

**Important:** Please note that the originals of the above certificates should be produced at the time of physical verification at the Institute.

## 9. Fees and Deposits:

### M.S/Ph.D. Fee Structure July-December 2021 Semester

S.No	Items of Fees & Deposits	M.S. (Rs.)	Ph.D (Rs.)
<b>I. Institute Fees (Applicable to all students)</b>			
<b>A. One time fees:</b>			
A1.	Admission fee	150	150
A2.	Grade card/Thesis fee	450	950
A3.	Provisional certificate fee	100	100
A4.	Medical Exam fee	100	100
A5.	Student welfare fund	1000	1000
A6.	Modernisation fee	500	500
A7.	Alumni Life Membership fee(NS)	1000	1000
A8.	Publication fee(NS)	250	250
A9.	Placement training fee	1000	1000
<b>Total A</b>		<b>4,550</b>	<b>5,050</b>
<b>B. Semester Fees:</b>			
B1.	Tuition fee #	2500	2500
B2.	Examination fee	300	300
B3.	Registration-Enrolment fee	300	300
B4.	Establishment 'A' charges	6000	6000
B5.	Gymkhana fee	1250	1250
B6.	Medical fee	700	700
B7.	Student Wellness fee	100	100
B8.	Medical Insurance Premium	750	750
<b>Total B</b>		<b>11,900</b>	<b>11,900</b>
<b>C. One time deposits (Refundable):</b>			
C1.	Institute Deposits	1000	1000
	Library Deposits	1000	1000
<b>Total C1</b>		<b>2,000</b>	<b>2,000</b>
<b>Total fee payable to Institute Fee Account (A+B+C1)</b>		<b>18,450</b>	<b>18,950</b>

<b>II. Hostel &amp; Mess Charges: (Applicable only to Hostellers)</b>			
<b>C. One time deposits (Refundable):</b>			
C2.	Hostel Deposit (NS)	3000	3000
<b>Total C2</b>		<b>3,000</b>	<b>3,000</b>
<b>D. Recurring charges:</b>			
D1.	Hostel Admission fee	250	250
D2.	Establishment 'B' charges	1500	1500
D3.	Hostel Seat Rent	5000	5000
D4.	Fan, Electricity & Water charges	750	750
D5.	SWD charges	50	50
D6.	Advance Dining charges	27600*	27600*
<b>Total D</b>		<b>35,150</b>	<b>35,150</b>

NS – Non-Statutory fees

\* For budgetary purposes, calculations are based on the rates prevalent during the current academic year for the period of six months (July to December) / (January to June). A nominal increase in charges may occur. Dining Charges will be on pro-rata basis.

# SC/ST/PwD scholars are exempted from payment of tuition fee

## **Statement of Purpose for Graduate Studies**

*(applicable to the Departments of Mechanical Engineering and Physics)*

The statement of purpose should be a coherent composition detailing your experience and achievements, and should also explain why you are interested in graduate studies. It should provide convincing arguments that you show promise for success in your graduate study and research.

Here are some points that you may want to consider while writing the statement of purpose. These points are mere guidelines – it is not necessary that you address all of them. Instead, pick all the relevant ones, and write a well-organized essay, making sure that it does not turn out to be a bald statement of facts.

1. Introduce yourself.
2. What motivated you to choose a career in research?
3. Elaborate on your academic/research interests.
4. Do you have any specific research problems in mind that you would like to work on during your graduate study?
5. Do you have any prior research experience? If so, provide details.
6. What are your short term and long term career goals?
7. Why did you apply for graduate studies at IIT Tirupati?
8. Have you looked at the research profiles of the faculty members working in your field of interest? Whom would you like to collaborate with for your graduate study?

Remember that there is no standard formula to write a good SOP. Take this a chance to talk to the admissions committee. So, make sure to explain what makes you unique in a pool of similarly qualified students.

### **Instructions to students**

1. **Page limit: 1-2 pages**
2. **Font: Times New Roman, Size 12**
3. **Format: pdf document**
4. **Indicate name on top of the SOP (Font size 14, Bold, Centered)**
5. **Spacing: Single**
6. **Pdf Naming Convention: Applicant Name.pdf**
7. **See the sample below:**

### **STATEMENT OF PURPOSE (Size 14)**

**Applicant Name (Size 14)**

Statement of purpose starts here.....  
.....  
.....  
.....  
.....  
..... and ends here.