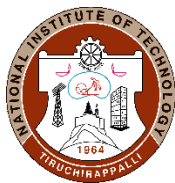


**ADMISSION TO Ph.D. PROGRAMMES**  
(July 2020 Session)

*Information Brochure*



**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-620015**



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-620015  
TAMILNADU

ADMISSION TO Ph.D. PROGRAMMES 2020 - 2021 (July 2020 Session)

## Ph.D. Programme (Full Time)

### A. ELIGIBILITY AND ACADEMIC REQUIREMENTS

#### 1. Faculty of Engineering

Bachelor's and Master's / M.S. (by Research) degree in Engineering / Technology in the appropriate branch of study with a qualified GATE score obtained in the last five years from the closing date of application form and with a minimum of 60% (or above) aggregate marks (CGPA  $\geq$  6.5/10) in UG and PG for admission under OC/OC-EWS/OBC-NCL category and 55% aggregate (or above) marks or equivalent CGPA of  $\geq$  6.0 for SC/ST/PwD candidates.

#### Department of Metallurgical and Materials Engineering

Candidates with PG degree in Science (Physics/Chemistry/Material Science/Applied Science/Applied Physics/Applied Chemistry) followed by M.Tech. Degree/M.S (by Research) in Material Science and Engineering/equivalent PG degree in related discipline with a qualified GATE score obtained in the last five years from the closing date of application form are also eligible to apply. The department successfully runs Centre of Excellence in Corrosion and Surface Engineering (CECASE) brief profile of which can be viewed on <https://www.nitt.edu/home/academics/departments/cecasa/>.

CECASE (Part time only): Candidates with M.E./ M.Tech. in Metallurgical Engineering, Materials Science & Engineering, Welding Engineering, Industrial Metallurgy, Mechanical Engineering, Thermal Engineering, Manufacturing, Design, Automobile Engineering, Aeronautical Engineering, Nano Science & Nano Technology, Chemical Engineering, Electrical Engineering, Electronics Engineering, Instrumentation and Control Engineering or any other equivalent degree with a qualified GATE score obtained in the last five years from the closing date of application form are eligible to apply.

#### Department of Civil Engineering

Candidates with B.E. / B.Tech. in Civil Engineering and M.E. / M.Tech. (specialization listed below), with a minimum of 60% (or above) aggregate marks (CGPA  $\geq$  6.5/10) in UG and PG for admission under OC/OC-EWS/OBC-NCL category and 55% aggregate (or above) marks or equivalent CGPA of  $\geq$  6.0 for SC/ST/PwD also with a qualified GATE score obtained in the last five years from the closing date of application form are only eligible to apply.

SI No.	P.G. Specialization
1.	Structural Engineering
2.	Geotechnical Engineering
3.	Transportation Engineering
4.	Environmental Engineering
5.	Hydraulics and water resources
6.	GIS and Remote sensing
7.	Ocean Engineering

### **Department of Mechanical Engineering**

Candidates with B.E/B.Tech in Mechanical Engineering with Master's in Design/Thermal/Industrial Safety streams along with a qualified GATE score obtained in the last five years from the closing date of application form are eligible to apply.

### **2. Department of Architecture**

Bachelor's degree in Architecture/Planning and Master's degree in Architecture/Design/Planning/Building Engineering and Management/Building technology or its equivalent with a qualified GATE score obtained in the last five years from the closing date of application form and with a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in UG and PG for admission under OC/ OC-EWS/ OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in UG and PG for admission under SC/ ST/ PwD category.

### **3. Department of Management Studies**

2 years full time Master's degree in Business Administration / 2 years Post Graduate Diploma in Management / Master's Degree in Industrial Engineering / Management or Industrial Engineering / Management with Operations research / Systems / other relevant discipline with a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in UG and PG for admission under OC / OC-EWS / OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in UG and PG for admission under SC / ST / PwD category with a CAT / XAT / MAT / GMAT / GATE qualified score obtained in the last five years from the closing date of application form OR UGC-NET qualified score OR doctoral research fellowships like JRF / RGNF / other equivalent research fellowships for management may apply.

### **4. Department of Computer Applications**

Master's degree in Computer Applications or M.Sc.(Computer Science/OR&CA) with a qualified GATE score (obtained in the last five years from the closing date of application form) /NET/UGC/CSIR/NBHM score and a minimum of 60% (or above) aggregate marks (CGPA  $\geq$  6.5/10) in UG and PG for admission under OC/OC-EWS/OBC-NCL category and 55% aggregate (or above) marks or equivalent CGPA of  $\geq$  6.0 for SC/ST/PwD candidates.

Master's degree (M.E. / M.Tech.) in Computer Science and Engineering or Data Analytics with a qualified GATE score obtained in the last five years from the closing date of application form with 60% (or above) aggregate marks (CGPA  $\geq$  6.5/10) in UG and PG

for admission under OC/OC-EWS/OBC-NCL category and 55% aggregate (or above) marks or equivalent CGPA of  $\geq 6.0$  for SC/ST/ PwD candidates.

## **5. Department of Science**

### **Department of Mathematics**

Master's degree in Mathematics with a qualified GATE score (obtained in the last five years from the closing date of application form)/NET/ UGC/ CSIR/ NBHM score and a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in B.Sc and M.Sc for admission under OC/ OC-EWS/ OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in B.Sc and M.Sc for admission under SC/ST/PwD category.

### **Department of Chemistry**

Master's degree in Chemistry/Applied Chemistry with a qualified GATE score (obtained in the last five years from the closing date of application form)/NET/ UGC/ CSIR/ and a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in B.Sc and M.Sc for admission under OC/ OC-EWS/ OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in B.Sc and M.Sc for admission under SC/ST/PwD category.

### **Department of Humanities and Social Sciences**

Master's degree in the relevant discipline of Humanities/Social Science/Economics/Business Administration/Commerce/Statistics with a qualified UGC/NET/CAT/AIMA/XAT/MAT and a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in UG and PG for admission under OC/OC-EWS/OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in UG and PG for admission under SC/ST/PwD category.

### **Department of Physics**

Master's degree in Physics/Applied Physics/Materials Science/Applied Electronics with a qualified GATE score (obtained in the last five years from the closing date of application form) /UGC/NET/CAT/AIMA/XAT/MAT score and a minimum of 60% aggregate marks or equivalent CGPA of 6.5/10 in UG and PG for admission under OC/OC-EWS/OBC-NCL category or a minimum of 55% aggregate marks or equivalent CGPA of 6.0/10 in UG and PG for admission under SC/ST/PwD category.

(or)

M.Tech. in Non Destructive Testing with a qualified score in GATE obtained in the last five years from the closing date of application form with 60% (or above) aggregate marks or equivalent CGPA of  $\geq 6.5/10$  for admission under OC/OC-EWS/OBC-NCL category and 55% (or above) aggregate marks or equivalent CGPA of  $\geq 6.0/10$  for SC/ST/PwD candidates. In case of AMIE/ AMIIM candidates, a minimum of 55% is eligible for admission in all the branches.

## B. ADMISSION CATEGORIES

1. There are three categories of admission under Ph.D. (Full Time).

### 1.1 Ph.D. (Full Time) - Stipendiary Category

Half Time Research Assistantship (HTRA) is available to full time scholars who are admitted to Ph.D. programmes in different departments subject to the availability as stipulated by Ministry of Human Resources Development. The award and renewal of the assistantship/scholarship is as per the guidelines reissued by MHRD, from time to time. The recipients of HTRA are required to assist the department in academic works to a minimum of 8 hours per week. The assistantship / scholarship will not be available for sponsored candidates or to scholars getting financial support from any private agency or other agencies under state or central governments. The maximum period to complete the programme is 6 years for Full-time research scholars. However, HTRA will be given up to 5 years or date of submission of thesis whichever is earlier for Full-time research scholars.

The fellowships are available in the following departments. The areas of specialization for Ph.D. work in various departments are given in the Annexure-1

Departments	OC	OC-EWS	OBC-NCL	SC	ST	Total
Architecture	2	1	2	2	1	8
Chemical	4	-	2	1	1	8
Chemistry	3	1	2	1	-	7
Civil Engineering	4	2	4	2	1	13
Computer Applications	3	1	2	1	1	8
Computer Science & Engineering	2+1(PwD)	1	3	2	1	10
Electrical & Electronics Engineering	6+1(PwD)	1	2	1	-	11
Electronics & Communication Engg.	5	1	3+1(PwD)	2	1	13
Energy & Environment Engineering	1	-	-	1	0+1(PwD)	3
Humanities	1	1	1+1(PwD)	1	-	5
Instrumentation & Control Engineering	3+1(PwD)	-	2	1	-	7
Management Studies	3	1	1	0+1(PwD)	1	7
Mathematics	3	0+1(PwD)	2	1	1	8
Mechanical Engineering	5	1	4	3	-	13
Metallurgical & Materials Engineering	3	1	2	1	1	8
Physics	2	1	1	1	1	6

Production Engineering	5	1	3	2	-	11
<b>Total</b>	<b>58</b>	<b>15</b>	<b>38</b>	<b>24</b>	<b>11</b>	<b>146</b>

**Reservation:** Government of India reservation policy will be followed for OC-EWS/OBC-NCL/SC/ST and the Persons with Disabilities (PwD) Candidates. In the absence of application from PwD candidates, the seat reserved for PwD category will be filled by the candidate(s) who belong to the same category (without PwD).

Candidates having their own fellowships from funding agencies such as DST, CSIR, UGC, NBHM, etc. can apply for Ph.D. (full time) in any department relevant to the research grant.

### 1.2 Ph.D. - Internal category

Limited number of seats is allotted under Ph.D. Internal category approved by the competent authority. Faculty, staff members of institute and candidates working under sponsored project in NIT-Trichy with qualified GATE score (obtained in the last five years from the closing date of application form) / UGC / CSIR / NBHM / NET / CAT / ATMA / XAT / MAT score will be considered for admission under Ph.D. (Internal) – category.

**Note: Any faculty or staff members of the institute (NIT-Trichy) seeking admission to Part time Ph.D. program should submit the hard copy of completed online application through Proper Channel. However, the selection procedure shall remain the same as cited above.**

### 1.3 Ph.D. (Full Time) - Non-Stipendiary Category

Limited number of seats is allotted under non-stipendiary category in the Faculty of Science and Humanities. Candidates with qualified GATE score (obtained in the last five years from the closing date of application form)/ UGC / CSIR / NBHM / NET / CAT / ATMA / XAT / MAT score will be considered for admission.

## 2. Ph.D. (Part Time )

Part-time Ph.D. programme is offered by all the departments for working professionals from Govt. R&D Organizations / Public sector / Industries / National Research laboratories and for faculty members from Govt. / Govt. Aided /Private Engineering Colleges / Science and Arts Colleges / Universities. There shall be the following two broad categories for the candidates seeking to pursue part time Ph.D. at NIT-Tiruchirappalli:

**2.1 Part-time (External):** Candidates working in reputed industry / organizations having R&D facilities, Govt. R&D Departments / National Research Laboratories / Units of Government / Quasi Government / Public sector are considered under this category. For Ph.D. Programme (Part time – External) GATE score is not mandatory. The candidates must be **officially sponsored** by their employing organization. A candidate working in an establishment which is equipped with the necessary research and library facilities only shall be considered for admission under this category.

In particular, this provision shall be extended to regular faculty members of graduate engineering programme from NITT mentee institute, Dr. B.R.Ambedkar Institute of

Technology, Port Blair, Andaman and Nickobar Islands, to enroll and pursue Ph.D. programme as Part-time (External) research scholars in NITT. At the time of admission, the candidate must submit a “no objection” certificate from the Parent institute.

At the time of application, the employer must expressly undertake to pay full salary to the candidate and relieve him / her to complete his / her residential requirement. A candidate applying for admission to the external registration programme must provide detailed information about the research facilities available at his / her organization and a certificate from the employer / Supervisor that these would be available to him / her for carrying out research (Form-1). He/she should also provide the bio-data of the prospective supervisor (External Research Supervisor) or Research Coordinator who would supervise/co-ordinate the candidate's work at her/his organization (Form-2).

A committee appointed by the Director (consisting of Dean Academic or her/his nominee, Dean-R&C or her/his nominee and Head of the Department concerned or her/his nominee shall assess the adequacy of the research facilities in such organization/institution before recognizing the organization/institution for the above purpose.

**2.2 Part-time (on Campus):** Regular/Full-time teachers/employees working in Govt./Govt.aided/private Engineering/Technical institutions or Science and Arts Colleges/Universities/industry/public sector with qualified GATE score (obtained in the last five years from the closing date of application form)/ UGC / CSIR / NBHM / NET / CAT / ATMA / XAT / MAT score will be considered for admission under this category. At the time of admission, the candidate must submit a “**no objection**” certificate (Form-3) and also a “**relieving certificate**” from the Parent institute/organization to relieve her/him to complete her/his residential requirement. The candidate should have **at least three years’ experience** in a regular/permanent position at the time of application. The college/organization must have 5 years of its existence for patronizing candidates to Part-time Ph.D. program. The departments concerned would decide the candidature of the selected candidates.

### **2.3 Selection Procedure**

**For both categories, the mode and norms for selection shall be on par with those in force for full-time Ph.D. candidates.** Following the scrutiny and short-listing of the applications, eligible candidates will be called to attend a written test. The candidates, short listed based on the written test performance need to appear for a technical and personal interview by the Departmental Research Committee comprising of HOD, all eligible Research Supervisors and the Dean’s nominee (observer).

### **2.4 Duration of the Programme**

The duration of the programme and the time for submission of the thesis are counted from the date of provisional registration. The minimum duration of the Part-time Ph.D. Programme shall be three years for both categories (External and On campus). This implies that a candidate can submit the synopsis (duly satisfying other academic requirements) only after a minimum period of study of 36 months from the date of registration. The maximum period to complete the Part-time Ph.D. Programme is 7 years.

Hostel accommodation may be provided subject to availability.

## 2.5 Place of research work

The candidates admitted under external category will normally carry out part or all of his / her research work in their respective industry / organization / national laboratories, employing the scholar. For these scholars, there will be two Research Supervisors, one internal Research Supervisor from NIT Trichy and one external Research Supervisor / Co-supervisor from his / her place of work.

For the candidates admitted under “on campus” category, the place of work is NITT even though he/she may be carrying out a part of research work in her/his College / Institution. For these scholars, NITT faculty shall be the internal (principal) Research Supervisor. External Research Supervisor, if any shall be from the industry only.

## 2.6 Course work / Residential requirement

The candidates admitted under external category shall report to the research supervisor / DC at least on three different occasions (visits) in every semester for official discussions. The course work requirement can be considered to be fulfilled either by undertaking to study the courses at NIT Tiruchirappalli or by taking online courses under reputed agencies which are approved by the Doctoral Committee. After completion of online courses (after certification), the evaluation will be facilitated / carried out by the research supervisor / DC at NIT Tiruchirappalli. The course work shall be completed within one and half years of provisional registration in the programme. Subsequent to the completion of course work, they can continue their research work in their respective industry/ institution.

For the candidates under on campus category, the minimum residential requirement is one semester. Four relevant theory courses at Master’s degree level (as recommended by the DC) shall be taken by the scholar. Normally, the course work shall be undertaken during the residential period of one semester itself. The requirements relating to course work will be as per norms of fulltime scholars. Subsequently, the scholars shall continue their research work on a Part-time basis, through regular interaction with the Research Supervisor. The scholar (both external and on campus categories) shall spend at least one week per semester in the NIT-T campus until the submission of synopsis.

## C. SELECTION PROCEDURE

S.No.	Name of Programme	Category	Mode of Selection
1	Ph.D.	Full time / Part time	Written Test & Interview

The detailed Ph.D. Regulations are available at:

<https://www.nitt.edu/home/academics/rules/PhD-regulations-2019.pdf>



## D. HOW TO APPLY?

Candidates applying for Ph.D. programme must apply online through the web site [www.nitt.edu](http://www.nitt.edu). The information brochure is available in the website. **The processing fee per department preference** is Rs. 500/- for OC/OBC-NCL and Rs. 200/- for SC/ST/PwD candidates. For example - If 3 department preferences are chosen, candidates have to pay 3 times the processing fee as per the category she/he belongs to.

The fee payment should be made only through State Bank icollect mode

(<https://www.onlinesbi.com/prelogin/icollecthome.htm?corpID=88587>).

The last date for submission of application is **30-06-2020**.

## E. ENTRANCE TEST and INTERVIEW (Tentative Dates)

Candidate applying for more than one department must write the entrance test in all the departments.

Programme	Activity	Date & Time
Ph.D.	Written Test	Will be intimated later through NITT website
	Interview (for shortlisted candidates only)	

For further queries, contact:

The Chairperson (MS and PhD Admissions)

Academic Office

National Institute of Technology

Tiruchirappalli – 620015, Tamil Nadu.

Phone: +91 431 2503011, 2503668

E-mail: [phdsection@nitt.edu](mailto:phdsection@nitt.edu)

**LAST DATE FOR SUBMITTING ONLINE APPLICATION IS 30.06.2020**

**Sponsorship Certificate**

**(To be submitted in the Official Letter Head by the Ph.D. External Registration Candidates)**

The application from Mr./Ms.....  
working as..... in..... since  
..... is herewith recommended and forwarded for admission under External Registration  
Scheme for Part time Ph.D. Program in the Department of..... ,  
**National Institute of Technology, Tiruchirappalli**

Certified that:

1. Our organization has adequate facilities for carrying out the research as indicated by the applicant and if he/she is selected, these will be made available to her/him till the completion of the programme.
2. The applicant will be deputed/given leave for duration of her/his residence period at NIT, Tiruchirappalli.
3. Facilities will be made available to the Supervisor (External Research Supervisor) to supervise the work of the applicant and to attend the DC meetings at NIT, Tiruchirappalli, when necessary.
4. Till the completion of her/his research programme, the applicant will not ordinarily be transferred to another unit or place which may impede her/his work under the scheme. If such a transfer is necessary, NIT, Tiruchirappalli will be informed atleast before one month of such transfer order.
5. No part of the work carried out in fulfillment of the Research programme will be utilized commercially or for applying for a Patent without the approval of **National Institute of Technology, Tiruchirappalli**

**Date:**

**Signature of the Sponsoring Authority**

**Name and Designation**

**Seal of the organization/ Institution**

**Postal address of the Organization/ Institution:**

**Certificate from the External Research Supervisor/ Research coordinator  
(To be submitted by the Ph.D. External Registration Candidates)**

This is to state that in the event of Mr./ Ms. .... of this organization being selected for Part time Ph.D. programme in the Department of ..... under the External Registration Scheme of NIT, Tiruchirappalli, I agree to be her/his External Research Supervisor / Research coordinator and shall extend all possible guidance and access to the following facilities to enable her/him to carry out her/his research programme towards the submission of thesis.

**\*Particulars of Prospective External Research Supervisor/Research Coordinator:**

- (1) Name of proposed External Research Supervisor / Research coordinator (In Block letters):
- (2) Designation:
- (3) Academic qualifications of External Research Supervisor /Research coordinator:
- (4) Experience (No. of Years):
- (5) No. of Publications with details:
- (6) Membership in Professional Societies:

**Research Facilities (relevant to area of research only) Available: (To be listed here)**

**Date:** **Signature of the External Research Supervisor/Research Coordinator**  
**Name and Designation**

**Seal of the organization**

\*The external Research Supervisor should have a Ph.D. degree and a minimum of 2 papers in refereed journals. The research coordinator should have a PG degree with atleast ten years of experience.

**Form - 3**

**No Objection Certificate from the Employing Organization  
(To be submitted in the Official Letter Head by Ph.D. Part time - On campus candidates)**

The applicant .....  
working as .....in.....since ..... is herewith  
recommended and forwarded for admission under Part time on campus scheme for Ph.D.  
programme in the Department of  
..... National Institute of Technology, Tiruchirappalli

1. We note that facilities of the NIT, Tiruchirappalli will be made available to him/ her for carrying out the research work under the supervision of a Research Supervisor and he/ she has to pay full fees every semester for the use of laboratory, library and other facilities of the Institute.
2. The research facilities available in our organisation will also be accessible to him/ her in the case of selection.
3. The applicant will be deputed/given leave for duration of her/his residence period at NIT, Tiruchirappalli.
4. Till the completion of her/his research programme, the applicant will not ordinarily be transferred to another unit or place which may impede her/his work under the scheme. If such a transfer is necessary, NIT, Tiruchirappalli will be informed atleast before one month of such transfer order.
5. No part of the work carried out in fulfillment of the Research programme will be utilized commercially or for applying for a Patent without the approval of **National Institute of Technology, Tiruchirappalli.**

**Date:**

**Signature of the Sponsoring Authority  
Name and Designation**

**Seal of the organization/ Institution**

**Postal address of the Organization/ Institution**

**ANNEXURE – I**  
**AREA OF SPECIALIZATION**

<b>S.No</b>	<b>Department</b>	<b>Specializations</b>
1	Architecture	Architecture (General / Any specialization), Building technology and construction management, City planning/ Town & country planning, Fine arts (Painting), Landscape architecture and any emerging area of specialization related to its discipline.
2	Chemical Engineering	Bio-chemical engineering, Biotechnology, Process modeling and simulation, Electrochemical engineering, Advanced materials, Fuels and energy, Polymer engineering, Process control, Transfer operations, Water treatment & reclamation and any emerging area of specialization related to Chemical Engg. discipline.
3	Chemistry	Organic/Analytical/Physical chemistry
4	Civil Engineering	Structural engineering, Geotechnical engineering, Environmental engineering, Transportation engineering, Water resources engineering, Remote sensing & GIS
5	Computer Applications	Big data analytics, Bioinformatics, Cloud computing, Computational optimization, Computer networks, Cryptography, Data base management systems, Data compression, Data mining, Distributed systems, DNA computing, Graph theory and algorithms, Information extraction, Information retrieval, Information security, Membrane computing, Multimedia computation, Parallel computing, Software engineering, Text analytics, Theory of computing and Web technology.
6	Computer Science and Engineering	Algorithms and graph theory, Computer architecture/Computer hardware, Computer networks and network security, Databases and data mining, Operating systems, Cloud computing, Speech and vision, Theoretical computer science, VLSI design, Web informatics and Web technology, Wireless networks, Cryptography, Image processing & Image security, Machine learning, Deep learning, Natural language processing, Software engineering, Social network analysis and recommendation systems, Embedded and real-time systems, High performance computing, Data analytics, Data science, and any emerging area of specialization related to CSE discipline.
7	Energy and Environment	Algal technology, Waste water treatment, solar hybrid systems, Carbon capture technologies, Energy system analysis, Coal and biomass conversion, value added products from biomass and thermal storage, Energy storage, Energy conservation, Thermo-chemical conversion of biomass.
8	Electronics and Communication Engineering	Signal and image Processing, Wireless communication, Wireless networks, Microwave engineering, Microwave integrated circuits, Antennas, Metamaterials, RFMEMS, Optical communication, Photonics, Electronic packaging, Pattern recognition and Computational intelligence, VLSI design and any emerging areas of specialization related to ECE.

9	Electrical and Electronics Engineering	Applied electronics, Wireless sensor networks and knowledge management, Control and instrumentation energy engineering, High voltage engineering, Power electronics / Power electronics & drives / electrical drives & control / Electrical machines, Power systems, VLSI systems and any emerging area of specialization related to its discipline.
10	Humanities and Social Sciences	<b>English:</b> Language teaching, Literature, Linguistics. <b>Economics:</b> Entrepreneurship development, Financial economics, Industrial economics. Any emerging area of specialization related to English and Economics.
11	Instrumentation and Control Engineering	Sensor design and development, Control theory, Sensor signal processing, Biomedical, Network control system, Artificial intelligence, Process and industrial automation and any emerging area of specialization related to Instrumentation and Control Engineering.
12	Management Studies	Marketing, Finance, Human resource management/Organization behavior and any emerging area of specialization related to its discipline.
13	Mathematics	Computational fluid mechanics, Numerical analysis and differential equations, Networks and graph algorithms, Probability and applied Statistics, Geometric function theory.
14	Mechanical Engineering	Alternate fuels, Automobile engineering, Biomechanics, Combustion, Computational fluid dynamics, Cryogenics, Design of pressure vessel and piping, Energy storage systems, FE Simulation, Fluid mechanics, Fluid power systems and control, Heat transfer, IC Engines, Industrial safety engineering, Machine design, MEMS, Nanomaterials and composites, Peridynamics, Polymer composites, Refrigeration and air conditioning, Renewable energy, Solar energy applications, Stress analysis, Thermal management, Vibrational analysis, Welding, Wind turbine, and 3D Printing.
15	Metallurgical and Materials Engineering	Bio-materials, Ceramic materials, Composite materials, Computational materials science, Corrosion, Electro – chemistry, Failure analysis, Foundry technology, Fuel cells, Iron making and Steel making, Joining of materials, Material characterization, Materials processing, Mechanical behaviors of materials, Metal casting, Metal forming, Mineral processing, Nano-materials, Non destructive testing, Non-ferrous extraction, Non-metallic materials, Physical metallurgy, Polymers, Powder metallurgy, Process metallurgy / Extractive metallurgy, Process modeling, Simulation, Structure property Correlations, Surface engineering, Welding and any emerging area of specialization related to its discipline.  CEECASE: Basic and applied aspects of corrosion science and engineering, surface science and engineering; Surface catalysis, Spectroscopy and sensors, Engineering and industrial tribology, Lubrication, Industrial coatings, Thermal spray, Laser surface engineering, Weldment corrosion & its control, Corrosion inhibition, Castings, Development of new materials, Coatings for High temperature applications, Nano materials, Nano composite coatings, Solid state joining, Process control and instrumentation, Electro chemical engineering – as applicable to Railways, Power Plants, Process industries, Petro chemical

		plants, Naval / Marine, Mining, Paper and Pulp, Automobile and all their allied industries.
16	Physics	Nano fluid and nano materials, Thin film & applications, Energy harvesting & Energy storage devices, DFT and condensed matter physics, Non linear materials, Nanostructured materials and any emerging area of specialization related to its discipline.
17	Production Engineering	Production engineering / Manufacturing engineering / Industrial engineering / Mechanical engineering any emerging area of specialization related to its discipline.