

# **VJTI MUMBAI**

**वीरमाता जिजाबाई तंत्रज्ञान संस्था**

**Veermata Jijabai Technological Institute**

**(Autonomous Institute of Govt. of Maharashtra)**

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**INFORMATION BROCHURE AND APPLICATION FORM**

**For**

**Admission to Doctor of Philosophy (Ph. D.) Program**

**AY 2025-26**

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## 1. Ph.D. programmes offered by VJTI

The Doctor of Philosophy (Ph.D.) Programme is offered by the following Departments in the related areas of research are as follows:

Programme Code	Programme Name	Broad Areas of Research
901	<b>Civil Engineering</b>  <i>Facilities available:-</i> <a href="https://vjti.ac.in/civil-environmental-engineering/">https://vjti.ac.in/civil-environmental-engineering/</a>	Construction Management, Construction Engineering, Construction techniques, Construction Materials, Construction Technology, Contract management, Geospatial technology, Building drawings, Transportation Engineering Environmental engineering, Solid waste hazard management, Industrial waste hazard management, Environmental Impact Assessment, Advance Hydraulic, Water resource management, Air and Noise Pollution, Environmental Sustainability, Irrigation Engineering, Water resource management, Advanced Hydrology, Ground Water Hydrology, Open channel flow, Dam and Hydraulics Structure, Geospatial technology, Structural Health Monitoring, Composite Materials, Performance based design for tall structures, Stability and Seismic Analysis of Cold-formed steel Structures, Geotechnical Engineering.
902	<b>Mechanical Engineering</b>  <i>Facilities available:-</i> <a href="https://vjti.ac.in/mechanical-engineering-vjti-mumbai">Mechanical Engineering – VJTI Mumbai</a>	Design Engineering, Thermal Engineering, Rapid Manufacturing, Digital Manufacturing, Non-Traditional Manufacturing, Micro-Manufacturing, Automobile Engineering, Vehicle Dynamics, Surface Engineering, Decision Sciences, Multi-criteria Decision-Making, Scheduling and Sequencing, I.C.Engines, Advanced Heat Transfer, Electric and Hybrid Vehicles, Battery Managements Systems in E- Vehicles, Heat Exchangers, Cryogenics, HVAC, Fluid Flow Analysis, Green Hydrogen, Statistical Thermodynamics, Fluid Dynamics, Gas Dynamics, Computational Fluid Dynamics, Fluid Machinery, condition monitoring and AI ML and Digital twin, Tribology and AI ML
903	<b>Electrical &amp;</b>	Renewable integrated grid operation, power system analysis, stability, control, computational electromagnetics, RF and microwaves, antennas.
906	<b>Electronics Engineering</b>  <i>Facilities available:-</i> <a href="https://vjti.ac.in/electrical-engineering/">https://vjti.ac.in/electrical-engineering/</a>	Optics and Sensing, Sensor designing and development, Biosensors, BioMEMS, VLSI fabrication, Nanotechnology, Nanomaterials, Lab-on-chip, Microfluidics, Plasmonics, Experimental physics, Digital image processing, Content-based image processing, Deep learning, AI & ML, IoT, Computer Vision, Signal processing, Bio-medical applications.
904	<b>Production Engineering</b>  <i>Facilities available:-</i> <a href="https://vjti.ac.in/production-engineering/">https://vjti.ac.in/production-engineering/</a>	Sustainable Manufacturing, Machining and Grinding of Aerospace Alloys, Digital Twin for Manufacturing, Industry 4.0, Tribology in Manufacturing, Metal Additive Manufacturing (AM), Hybrid approaches in Additive Manufacturing, Electro- pulsing applications for AM, Welding and Machining, Surface Engineering, Condition Based Maintenance, Reliability Engineering, Applications of AI & ML in Manufacturing, thermo-fluids, Uncertain Heat Transfer. Composite Materials and Nanotechnology
905	<b>Textile Engineering</b>  <i>Facilities available:-</i> <a href="https://vjti.ac.in/textile-engineering/">https://vjti.ac.in/textile-engineering/</a>	Advanced spinning technology, Fiber reinforced Composite materials, Technical textiles, Coated textiles, Sustainable processing of textiles, Conductive textiles and smart materials, Nanotechnology in textiles, Recycling of textile waste products, Multifunctional finishing of textiles, Advanced Nonwoven Substrates, Thermo regulatory Textiles, Special Garments for people with disability.
907	<b>Computer Engineering</b> <i>Facilities available:-</i> <a href="https://vjti.ac.in/computer-it/">https://vjti.ac.in/computer-it/</a>	Artificial Intelligence, machine learning, deep learning, High performance computing, Internet of things, precision agriculture, wireless network, network security, cyber security, block chain technology
910	<b>Chemistry</b> <i>Facilities available:-</i> <a href="https://vjti.ac.in/technical-applied-chemistry/">https://vjti.ac.in/technical-applied-chemistry/</a>	Catalysis, Organic synthesis, Organ phosphorous Chemistry, Organometallic compounds, Coordination compounds, Nano materials
908	<b>MCA</b> <i>Facilities available:-</i> <a href="https://vjti.ac.in/master-of-computer-applications/">https://vjti.ac.in/master-of-computer-applications/</a>	Machine Learning, Deep Learning, Cloud Computing, IOT, Quantum computing.

## 2. Important dates:

Sr. No.	Activity	Date (Tentative)	Day
1	Available of online application forms	16.05.2025	Friday
2	Last date for submission of completed application forms	09.06.2025	Monday
3	Display of shortlisted candidates on website	16.06.2025	Monday
4 *	Clarification/Objection on shortlisted candidates	19.06.2025	Thursday
5	Display of corrected shortlisted candidates	23.06.2025	Monday
6	Written Test by respective Department	07.07.2025	Monday
7 #	Interview by respective Department level	08.07.2025 & 09.07.2025	Tuesday & Wednesday
8	Centralized Interview at Institute level for candidates shortlisted at Department level	10.07.2025 & 11.07.2025	Thursday & Friday
9	Display of Final Merit List on website	17.07.2025	Thursday
10	Last day for confirmation of provisional admission by paying fees	31.07.2025	Monday

\* In case of any clarification or objection on shortlisted candidates, the candidates may communicate by sending an email to [phd\\_admission@vjti.ac.in](mailto:phd_admission@vjti.ac.in) by **19.06.2025** before 5.00 pm

# Interview shall be conducted by the concerned department at VJTI.

## 3. Application Processing Fee:

<b>General Category:</b>	<b>Rs. 500/-</b>
<b>Reserved Category:</b> SC, ST, VJ/DT- NT(A), NT(B), NT(C), NT(D), OBC, SBC, EBC, EWS & Differently abled person	<b>Rs. 300/-</b>

*Application processing fee shall be paid online as per procedure given in Annexure –V*

## 4. Submission of the application:

Candidates must submit their application form with necessary application fees (along with all the relevant certificates/documents) online through Google form (applications without online submission of application as well as certificates/documents will not be considered). Candidate should make sure that proper Institute/ Discipline codes are entered and all relevant details are duly filled in the respective fields. Access to the link for online submission of application opens on 16.05.2025. Last date for the online submission of application is 09.06.2025 at 5.00 pm.

## 5. Google link to fill Ph.D. application form:

<https://forms.gle/GPostjG64HERK2QeA>

## 6. Eligibility for Admission

### Educational Qualification:

Subject to the conditions stipulated in Directive No. CG-DL-E-07112022-240086 dated: 7<sup>th</sup> November 2022 of UGC Regulations, 2022, the following persons are eligible to seek admission to the Ph.D. programme:

### Candidate who have completed:

- A 1-year /2-semester Master's degree programme after a 4-years/8-semester Bachelor's degree programme or a 2-year/4-semester Master's degree programme after a 3 year Bachelor's degree programme or qualification declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed
- Or equivalent qualification form a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of the educational institution.
- A relaxation of 5 % marks or its equivalent grade may be allowed for those belonging to SC, ST, VJ/DT- NT(A), NT(B), NT(C), NT(D), OBC (non-creamy layer), SBC, EBC, EWS & Differently abled and other categories of candidates as per the decision of the Commission from time to time.
- Provided that a candidate seeking admission after a 4-year/8-semester Bachelor's degree programme should have a minimum of 75% marks in aggregate or its equivalent grade on a point scale wherever the grading system is followed. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC, ST, VJ/DT- NT(A), NT(B), NT(C), NT(D), OBC (non-creamy layer), SBC, EBC, EWS & Differently abled and other categories of candidates as per the decision of the Commission from time to time.

*Note: Institute reserves the rights to admit candidates based on merit and performance during written test & Interview. Mere satisfaction of minimum qualification does not entitle admission to Ph.D. programs.*

## 7. Procedure for Admission to Ph.D. programmes

- a. The admission shall be based on the criteria notified by the institution, keeping in view the guidelines/ norms in this regard issued by the UGC and other statutory/regulatory bodies concerned, and taking into account the reservation policy of the State Government/institute guidelines from time to time.
- b. Admission to the Ph.D. programme shall be made using the following methods:
  - i. Institute may admit students who qualify for fellowship/scholarship in UGC- NET/UGC-CSIR NET/GATE/CEED and similar National level tests based on an interview.  
And/or
  - ii. Institute may admit students through an Entrance Test conducted at the level of the individual. The Entrance test syllabus shall consist of 50% of Research Methodology and 50% shall be subject specific.
  - iii. Students who have secured 50% marks in the entrance test are eligible to be called for the interview.
  - iv. A relaxation of 5% marks will be allowed in the entrance examination for the candidates belonging to SC, ST, VJ/DT- NT(A), NT(B), NT(C), NT(D), OBC (non-creamy layer), SBC, EBC, EWS & Differently abled and other categories of candidate as per the decision of the Commission from time to time.
  - v. Institute may decide the number of eligible students to be called for an interview based on the number of Ph.D. seats available.
  - vi. Provided that for the selection of candidates based on the entrance test conducted by the

institute. A weightage of 70% for the entrance test and 30% for the performance in the interview/viva-voce shall be given.

#### 8. Seat Matrix:-

The number of seats depends upon the number of available research guides in the Institute, vacancies available with the guide and research infrastructure in the concerned Department. The admission of candidates to Ph.D. programme depends on the expertise available in a department and the willingness of the candidate to work in the corresponding research areas. The following table shows the tentative number of seats available in various Departments for admission during July-December, 2025 session, however, the number of seats may increase/decrease as per the vacancies available at the time of admission and it is also not mandatory to the Institute to fill all vacant positions displayed in AY 2025-26 only.

Sr. No.	Department	Number of Vacant seats	<a href="#"><u>Ph.D. Supervisors</u></a> <a href="#"><u>details with</u></a> <a href="#"><u>Research Area</u></a>
1	Civil Engineering	39	
2	Mechanical Engineering	43	
3	Electrical Engineering	30	
4	Production Engineering	14	
5	Textile Technology	8	
6	Computer Engineering	22	
7	Chemistry	04	
8	Computer Applications	04	

*Reservation policy in the admission will be implemented as per the norms of State Government of Maharashtra. Category wise vacant positions will be displayed by the respective department on the day of Interview.*

#### 9. Exemption from the Written Test

The following candidates shall be exempted from Written Test:

- Candidates qualified having valid scores in UGC-NET/UGC-CSIR NET ISLET/GATE /INSPIRE / PET (By Maharashtra Public Universities) and any other JRF holder of the apex bodies like CSIR/ UGC/ ICAR/ ICMR/ DBT/ DST/ ICSSR;
- Ph.D. degree holder of University of Mumbai or any other recognized University who desires to pursue Ph.D. at VJTI.

#### 10. Types of Ph.D. candidates

##### 1. Ph.D. Full Time (Under Institute Fellowship with Teaching Assistantship-cum-Scholarship)

Master's Degree in Engineering/Technology/Science /Computer Applications in the relevant area of research along with a Bachelor's Degree in appropriate branch of Engineering/Technology/Science /Computer Applications with a first-class or minimum 60% marks (or CGPA of 6.75 on 10-point scale) in the qualifying examination. For getting institute-level Teaching Assistantship-cum-Scholarships, the candidates with a Master's degree in Engineering/Science /Computer Applications must have qualified GATE exam as a mandatory requirement.

- a. *Institute will provide Teaching Assistantship-cum-Scholarships to two students per Department (Rs. 35,000/-)*
- b. *In addition to two students per Department, Institute will provide Teaching Assistantship-cum-Scholarships to two students of Textile Engineering Department under NTTM (National Technical Textile Mission) project and one student under Centre of Excellence in Artificial Intelligence (COE-AI).*
- c. *While finalizing the candidate for Institute Fellowship, reservation policy will be implemented as per the norms of the Government of Maharashtra.*
- d. *Teaching Assistantship-cum Scholarship will be provided for a period of three years and will be extended for one more year depend upon the performance of candidate.*

## **2. Full Time Non-Sponsored/ Sponsored Research Scholar**

Candidate is required to be available in the institute full time for a period of at least three years. There is a possibility of Research / Teaching assistantship available to the candidate from institute funds or research projects. Candidates sponsored by their parent organizations cannot avail of Research / Teaching assistantship. Sponsored candidates have to produce a sponsorship letter in given format along with application form.

## **3. Part Time Sponsored Research Scholar / VJTI internal candidates**

Candidate is required to complete at least two semesters of residential requirement at the institute. Sponsored candidates have to produce sponsorship letter in a given format along with application form. Institute internal candidates have to apply as part time research scholars only. Internal candidates have to work under VJTI supervisor and/or external supervisor from IIT or other research organizations (optional with recommendation from DAC).

## **11. Course Duration of the Programme:**

- Ph.D. programme shall be for a minimum duration of three years for full time and four years for part time candidates, including course work, and a maximum duration of six years from the date of admission to the Ph.D. programme.
- A maximum of an additional two years can be given through a process of re-registration as per the statute/ordinance of the institute concerned; provided, however, that the total period for completion of a Ph.D. programme should not exceed eight years from the date of admission in the Ph.D. programme.
- Provided further that, female Ph.D. scholars and person with Disabilities (having more than 40% disability) may be allowed an additional relaxation of two years; however, the total period for completion of a Ph.D. programme in such cases should not exceed ten years from the date of admission in the Ph.D. programme.
- Female Ph.D. Scholars may be provided maternity leave/Child care leave for up to 240 days in the entire duration of the Ph.D. programme.
- The number of credits to be earned will be 24 (8 courses) for Bachelor's degree programme and 12 (4 courses) for Masters.

### **No Objection Certificate:**

All sponsored candidates must submit 'No Objection Certificate' from the employer in a format given in Annexure III along with application.

### **Sponsorship letter**

All sponsored candidates must submit 'Sponsorship letter' from the employer in a format given in Annexure II along with application.

## 12. Reservation

Reservation policy in the admission and for Institute Fellowship with Teaching Assistantship-cum-Scholarship will be implemented as per the norms of State Government of Maharashtra. Category wise vacant positions will be displayed by the respective department on the day of Interview.

## 13. Fees

<b>Fees in Rs. for confirmation of Admission at VJTI for Ph. D. students</b>			
<b>Sr. No</b>	<b>Year</b>	<b>Full Time</b>	<b>Part Time</b>
<b>1</b>	<b>First Year</b>	<b>54,051/-</b>	<b>74,551/-</b>
<b>2</b>	<b>Second Year to Fourth Year</b>	<b>51,350/-</b>	<b>71,850/-</b>
<b>3</b>	<b>Fourth Year Onwards</b>	<b>71,350/-</b>	<b>91,850/-</b>

*This fee is applicable only for candidates admitted in A.Y.2025-26*

### *Notes:-*

- a. For confirmation of seat allotted, all candidates have to pay appropriate amount of fee as applicable.
- b. All reserve category students seeking admission to Ph.D. Programs, shall have to pay full fees at the time of admission/ registration.
- c. Candidate whose result of qualifying post graduate degree is awaited:
  - Must have submitted the thesis on the day of interview.
  - These candidates must submit the certificate as per Annexure IV and produce the copy of dissertation at the time of interview.
  - The admission shall be provisional and will be confirmed only if the result of qualifying examination is submitted on or before October 2025.
- e) No change in category of admission (Full Time to Part Time or vice versa) will be allowed at the time of examination or admission.
- f) Information related to Ph.D. admission 2025-26 will be displayed only on VJTI website <http://www.vjti.ac.in> Applicants shall visit the Institute website for time to time.

## Annexure –I

### List of Documents to attached along with application form

Attested photocopies of following documents/certificates should be attached with the application form at the time of submission. If a candidate fails to submit applicable documents/certificates along with application form, he/she will not be shortlisted for Ph. D. admission 2025-26.

Sr. No.	Document Name
1	Graduation degree certificate
2	Final year mark list / grade sheet
3	Post graduate degree certificate
4	Post graduate Final year mark list / grade sheet
5	Work/ Research experience Certificates
6	<b>Nationality Certificate:</b> In lieu of this “Certificate of Indian Nationality” following Certificates/Documents will also be acceptable- 1. Indian Passport in the name of the Candidate, issued by appropriate authorities. 2. The School Leaving Certificate indicating the Nationality of the Candidate as ‘Indian’. 3. Birth Certificate of the Candidate indicating the Place of birth of the Candidate is within India.
7	<b>Caste certificate:</b> Candidates belonging to categories SC, ST, VJ/DT-NT(A), NT(B), NT(C), NT(D), OBC, SBC will be required to submit a Caste Certificate
8	<b>Caste Validity Certificate:</b> Candidates belonging to SC, ST, VJ/DT-NT (A), NT (B), NT(C), NT(D), OBC, SBC category are required to submit Caste Validity Certificate.
9	<b>Non-Creamy Layer Certificate</b> A candidate belonging to ‘Creamy Layer’ amongst the categories SBC, V.J./D.T.-N.T.(A), N.T.(B), N.T.(C), N.T.(D), O.B.C. must note that the provision of reservation is NOT applicable to him/her. A candidate claiming benefit of reservation under the categories SBC, V.J./D.T.-N.T.(A), N.T.(B), N.T.(C), N.T.(D), O.B.C. will be required to produce “Non-Creamy Layer Certificate” in the name of the candidate as specified in the Government Resolution No. CBC/10/2008/CR-697/BCW-5, dated 27 <sup>th</sup> February 2009 or its updated versions from time to time. The certificate must be valid up to 31 March 2026.
10	<b>Differently abled Certificate</b> (if applicable): The candidate claiming to be physically handicapped shall produce a certificate from the Director, All India Institute of Physically Handicapped, Mumbai or Dean/Civil Surgeon of the Government / CIVIL HOSPITALS normally located at the District Headquarters, regarding his or her physical disability, and ability to undergo all parts of syllabus for the normal course. Candidates suffering from Dyslexia, Dysgraphica & Dyscalculia are required to produce certificate issued by the ‘Learning Disability Clinic, Lokmanya Tilak Municipal General Hospital, Sion, Mumbai-22.
11	Proof of Exemption for Written test
12	Annexure II
13	Annexure III
14	Annexure IV
15	Receipt of application processing Fee
16	Copy of first page of research papers published in journal / conferences
17	Statement of purpose from the candidate (one page justifying the research area)
18	Any other Certificates

## Annexure -II

Format for Sponsorship Letter for Full time/Part Time sponsored candidate  
(To be submitted at the time of application/ Interview.)

(To be filled in by sponsoring organization on their letter head only)

Date:

### SPONSORSHIP LETTER

Shri. /Smt. /Ms.....is a Full Time employee of our organization since ..... (Date) and working as ..... (Designation in the organization) from last ..... years.

If selected, I/ we hereby sponsor him/her to join the Ph.D. degree programme in ..... Department of VJTI as

(a) Full Time Sponsored candidate for the period of Three years at VJTI

**OR**

(b) Part Time Sponsored candidate for the first year of Ph. D. programme to complete mandatory course work. Thereafter he/she will be allowed to report to the research supervisor for at least two working days in a month.

I/ We shall relieve him/her of all responsibilities in our organization for a minimum period mentioned above to enable him/her to pursue the Ph.D. programme.

*(Note: Tick Mark whichever is applicable from above a or b)*

Signature of Sponsoring Authority

Name: .....

Place: .....

Designation: .....

Date: .....

Organization: .....

Seal of  
Organization

### **Annexure -III**

Format for NOC for Full time/Part Time sponsored candidate  
(To be submitted along with application form.)

(To be filled in by sponsoring organization on their letter head only)

Date:

#### **No Objection Certificate**

Shri. /Smt. /Ms.....is a full time employee of our organization since ..... (Date) and working as ..... (Designation in the organization) from last ..... years.

If selected, I/ we have no objection to him/her to join the Ph.D. degree programme in ... .. Department of V J T I, Matunga, Mumbai – 400019 and will issue sponsorship letter as per Annexure II at the time of interview as a

(a) Full Time Sponsored candidate for the period of Three years at VJTI Mumbai

**OR**

(b) Part Time Sponsored candidate for the first year of Ph. D. programme to complete mandatory course work. Thereafter he/she will be allowed to report to the research supervisor for at least two working days in a month.

*(Note: Tick Mark whichever is applicable from above a or b)*

Signature of Sponsoring Authority  
Name: .....

Place: .....

Designation: .....

Date: .....

Organization: .....

Seal of  
Organization

## **Annexure –IV**

### Format of Certificate

For candidate who have appeared in the qualifying degree examination i.e. M.E./M.Tech/MSc/MCA/B.E/B.Tech/UG in relevant filed or Equivalent Examination and whose dissertation is submitted.(To be filled along with application form)

(To be filled in by respective organization on their letter head only)

Date:

### **Certificate**

Shri. /Smt. /Ms.....is a M.Tech/M.E/MSc/MCA/B.E/B.Tech/UG in relevant filed student of ..... (Name of Programme) in our Institute for Academic Year ..... and submitted his/her M.Tech/M.E/MSc/MCA/ B.E/B.Tech/UG in relevant dissertation on ..... (Date) for Evaluation.

Signature of  
Head of Department/Principal/Director/ Authority

Name: .....

Place: .....

Designation: .....

Date: .....

Organization: .....

Seal of  
Organization

## **Annexure –V**

Steps to be followed for making online payment (Application Processing Fee) through

### STATE BANK COLLECT

- Log on to <https://www.onlinesbi.sbi>
  - Home Page STATE BANK COLLECT
  - Click on State Bank Collect
  - Select Type of Category as ‘Educational Institutions’
  - Select the Name of the institution as ‘Veermata Jijabai Technological Institute’
  - Select the appropriate ‘Payment category’ as indicated below:
  - Application Processing Fee
  - On next screen Enter the details (like Name, Birth date, ID No. Should be ‘0’; Select your branch, Year ‘First Year’ mentioned in Remark as “PhD Application Fees” etc.) asked for
  - Select options, wherever necessary carefully
  - Proceed as instructed and Click on ‘Submit’
  - On next screen verify details and click on ‘Confirm’
  - You will be taken to payment gateway
  - Select appropriate payment mode
  - Check the charges/commission applicable for selected ‘Mode of Payment’  
Follow instructions to Print Challan and pay at any SBI branch in Cash
- OR
- Pay ‘online’ using Internet Banking / Credit / Debit card
- Print receipt online.
  - Copy of receipt (and not challan) should be enclosed with Application Form.

**Make sure that the payments are made a day or two prior to Last date of submission of application. Institute is not responsible if the site is down for technical reasons and the last minute payments are not possible.**

## Annexure-VI

### Syllabus for Ph.D. Entrance Examination

#### CIVIL & STRUCTURAL ENGINEERING

Sr. No	Areas of research for Ph.D. in Civil Engineering	Syllabus for entrance Test
1.	<b>Construction Management</b>	Construction Management, Construction Engineering, Construction techniques, Construction Materials, Construction Technology, Contract management, Geospatial technology, Building drawings, Transportation Engineering.
2.	<b>Environmental Engineering &amp; Water Resource Engineering</b>	Environmental engineering, Solid waste hazard mgmt, Industrial waste hazard mgmt, Environmental Impact Assessment, Advance Hydraulic , Water resource management, Air and Noise Pollution, Environmental Sustainability.
		Irrigation Engg, Water resource management, Advanced Hydrology , Ground Water Hydrology, Open channel flow, Dam and Hydraulics Structure, Geospatial technology
3.	<b>Structural Engineering</b>	Structural dynamics, Finite element method, FRP Composites, Plastic analysis, Plate and shell design, Geotechnical engineering, Soil Dynamics, Geotechnical Earthquake Engineering, Earthquake engineering, Concrete technology, Pre-stressed Concrete, Advanced structural analysis, Advanced foundation engineering and Low cost housing, Bridge Engineering, Non-linear Analysis ,Vibration Analysis, Steel Structure

**NOTE:**

- 1) Separate entrance test will be conducted for Ph.D. programs in Civil Engg with specialization areas in Structural Engineering, Construction Management, Environmental Engineering and Water resource Engineering
- 2) Candidate must appear for the entrance test of his or her M.Tech specialization / other specialization, He or She will be admitted only in the Ph.D. program of that specialization in which the candidates will pass the entrance test and not in any other specializations.

## COMPUTER ENGINEERING & INFORMATION TECHNOLOGY

Sr. No.	Syllabus for entrance Test	
1.	<b>Engineering Mathematics</b>	Discrete Mathematics, Linear Algebra, Calculus, Probability and Statistics.
2.	<b>Computer System</b>	Digital Logic, Computer Organization and Architecture, Operating System.
3.	<b>Theoretical Computer Science and Mathematics</b>	Theory of Computation, Compiler Design and Construction.
4.	<b>Communication</b>	Computer Network
5.	<b>C-Programming, Data Structure, Algorithms, Databases</b>	

## ELECTRICAL ENGINEERING

Sr. No.	Syllabus for entrance Test	
1.	<b>Topics from basic mathematics:</b>	Maxima/ minima, polynomials and their roots, sequences, series, and convergence, probability, permutations, combinations, prime numbers, Chinese remainder theorem, multivariable calculus, 2D/3D coordinate geometry, complex numbers.
2.	<b>Linear algebra:</b>	Rank of a matrix, solutions to $Ax=b$ , vector space, basis, eigenvalues, eigenvectors, determinant, characteristic polynomial.
3.	<b>Mathematical modeling:</b>	Linear ordinary differential equations, difference equations..
4.	<b>Topics from Electrical Engineering:</b>	<p>(i) Electrical and electronic circuits, basic network theory, network theorems, KCL/KVL, dynamics of RLC circuits, Signals and Systems, Electric and Magnetic Fields.</p> <p>(ii) Basic Concepts of Feedback Control Systems (Transfer Function and State Space Analysis, Step Response, Transient and Steady State analysis).</p> <p>(iii) Principle of operation and speed control of Electric machines: dc, induction, synchronous machines.</p> <p>(iv) Power electronics: Principle of operation of line commutated ac to dc converters, ac to dc converters, dc to dc converters, dc to ac inverters. Various pulse width modulation techniques like SPWM, Space vector pulse width modulation technique etc.</p> <p>(v) Power generation, transmission, and distribution. Models and performance of transmission lines and cables. Series and shunt compensation. Power System Analysis and Computation (Power-flow, admittance matrices, per-unit representation). Voltage and Frequency control, Power factor Correction, Fault Analysis and Protection, Power System stability.</p>

## ELECTRONICS ENGINEERING

Sr. No.	Syllabus for entrance Test	
1.	<b>Topics from basic mathematics:</b>	Maxima/ minima, polynomials and their roots, sequences, series, and convergence, probability, permutations, combinations, prime numbers, Chinese remainder theorem, multivariable calculus, 2D/3D coordinate geometry, complex numbers.
2.	<b>Linear algebra:</b>	Rank of a matrix, solutions to $Ax=b$ , vector space, basis, eigenvalues, eigenvectors, determinant, characteristic polynomial
3.	<b>Mathematical modeling:</b>	Linear ordinary differential equations, difference equations.
4.	<b>Topics from Electronics Engineering:</b> <ul style="list-style-type: none"> <li>(i) Basic Electrical and Electronic Circuits and Network Theory</li> <li>(ii) Crystal structure, electrons in solids, energy band theory, p-n junction diode, charge carriers in semiconductors, Drift-diffusion theory, MOS capacitors, field-effect transistors, bipolar junction transistors, LEDs and solar cells</li> <li>(iii) Basic Analog and Digital Circuits</li> <li>(iii) Linear and Non-linear Circuits (discrete and integrated)</li> <li>(iv) Signals and Systems: Continuous-time and discrete-time signals and systems, LTI systems and representations, Sampling and reconstruction, Transform domain analysis (Fourier, Laplace, and Z-transforms), Basics of filter design</li> <li>(v) Signal Processing: Representation of signals on orthogonal basis, Discrete systems: attributes, Z-Transform Analysis of LSI systems, Frequency analysis, Inverse Systems. Discrete Fourier Transform (DFT) Fast Fourier Transform algorithm Implementation of Discrete Time Systems: Design of FIR Digital filters, Design of IIR Digital filters</li> </ul>	

## MECHANICAL ENGINEERING

Sr. No.	Syllabus for entrance Test	
1.	<b>Engineering Mathematics</b>	Linear Algebra, Calculus, Differential equations. Complex variables, Probability and Statistics, Numerical Methods.
2.	<b>Applied Mechanics And Design</b>	Engineering Mechanics, Mechanics of Materials, Theory of Machines, Vibrations, Machine Design
3.	<b>Fluid Mechanics And Thermal Sciences</b>	Fluid Mechanics, Heat-Transfer, Thermodynamics, Applications: Power Engineering, I.C. Engines, Refrigeration and air-conditioning, Turbomachinery
4.	<b>Materials, Manufacturing and Industrial Engineering</b>	Engineering Materials, Casting, Forming and Joining Processes, Machining and Machine Tool Operations, Metrology and Inspection, Computer Integrated Manufacturing, Production Planning and Control, Inventory Control, Operations Research

## PRODUCTION ENGINEERING

Sr. No.	Syllabus for entrance Test	
1.	<b>General Engineering</b>	Engineering Materials: Structure, properties, heat treatment, iron-carbon diagram, Applied Mechanics: Force systems, equilibrium, trusses, stress-strain, Mohr's circle, beam deflection, torsion Theory of Machines and Design: Planar mechanisms, cams, gears, shaft design, brakes, clutches, pressure vessels
2.	<b>Thermal Engineering</b>	Laws (Zeroth, First, Second), pure substances, work/heat, entropy, Otto/Diesel/Dual cycles
3.	<b>Manufacturing Processes</b>	Casting & Metal Forming: Techniques, design, solidification, defects Joining of Materials: Welding (GMAW, GTAW, SMAW, Electroslag Welding, etc.), brazing, soldering, adhesive bonding Powder Metallurgy, Polymers & Composites: Processing techniques, molding methods Machining & Machine Tools: Mechanics of cutting, tool life, surface finish, conventional processes Advanced Manufacturing: EDM, ECM, LBM, Additive Manufacturing Computer Integrated Manufacturing: CAD/CAM, CNC, FMS, robotics, automation
4.	<b>Quality and Reliability</b>	Metrology and Inspection: Measurements, fits and tolerances, gauges, surface finish Statistical Quality Control: Control charts, acceptance sampling, Six Sigma Reliability and Maintenance: MTBF, system reliability, TPM, predictive/preventive maintenance
5	<b>Industrial Engineering</b>	Product Design & Development, Tolerancing, cost-quality tradeoffs, life cycle, DFX
6	<b>Operations Research &amp; Operations Management</b>	Operations Research: Linear Programming, Integer Linear Programming, Nonlinear Programming, queuing theory, simulation Engineering Economy & Costing: Costing principles, depreciation, investment analysis Production Control: Forecasting, MRP, ERP, scheduling, JIT, SCM, inventory management Project Management: CPM, PERT, GERT, resource leveling

## TEXTILE ENGINEERING

Sr. No.	Syllabus for entrance Test	
1.	<b>Fiber Science &amp; High Performance Fiber:</b>	Polymer, processes involved in conversion of polymer to fiber, structure development in fiber, properties of fiber, structure property correlation. Modern techniques in man-made fiber production. Raw materials, Production process & Application of high performance fibers
2.	<b>Yarn &amp; Fabric Formation:</b>	Preparatory processes. Different methods of yarn/fabric formation. Technological advances in yarn/fabric manufacturing, structure and structure- property relationship. Knitting techniques, classification, application etc.
3.	<b>Chemical Processing &amp; Eco textile Production:</b>	Preparatory processes e.g. singeing, desizing, scouring, bleaching, mercerizing, heat setting of textiles. Dyeing, printing and finishing of textiles. Development of eco-textile products coated & laminated materials; surface modification techniques for textile materials.
4.	<b>Technical Textile &amp; Nonwovens:</b>	All areas of technical textiles, product development & processes, Textile composites, Nonwovens, classification of nonwovens, evaluation and applications.
5.	<b>Testing:</b>	Sampling procedures. Fundamentals of testing of textile materials in various forms, testing methods for evaluation of various properties of Textiles.
6.	<b>Apparel Manufacturing &amp; Merchandising:</b>	Patterning, drafting and marker planning, sewing, quality control aspects, visual merchandising, retail and supply chain management.

## CHEMISTRY

Sr.No.	Syllabus for entrance Test	
1.	<b>Organic Chemistry:</b>	IUPAC nomenclature of organic molecules including regio- and stereoisomers. Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereo genicity, stereo selectivity, enantioselectivity, diastereoselectivity and asymmetric induction. Aromaticity: Benzenoid and non-benzenoid compounds – generation and reactions. Reaction mechanisms, name reactions, organic reagents, Pericyclic reactions – electrocycloisatation, cycloaddition, sigmatropic rearrangements and other related concerted reactions.
2.	<b>Inorganic Chemistry:</b>	Concepts of acids and bases, Hard-Soft acid base concept, Non-aqueous solvents. Main group elements and their compounds: Allotropy, synthesis, structure and bonding, industrial importance of the compounds. Organometallic compounds: synthesis, bonding and structure, and reactivity. Organometallics in homogeneous catalysis.
3.	<b>Catalysis:</b>	Surface and colloidal chemistry, Types of catalysis, Homogenous and heterogeneous catalysis, ion exchange catalyst, zeolites, criteria for selection of catalyst for industrial processes.
4.	<b>Polymer Science:</b>	Polymerization mechanism, polymer synthesis, characterization, polymer blends, amorphous and crystalline polymers, glass transition temperature, structure and property relationship of polymers, recycling of plastics.
5.	<b>Nanochemistry:</b>	Nano materials, structural features, characteristic property of nanomaterials, nano synthesis, characterization, applications
6.	<b>Environmental Chemistry :</b>	Types of pollution, preventive methods, industrial effluents, chemical analysis of effluents, COD, BOD, detection of toxic metals, ions, pesticides.
7.	<b>Solution Chemistry:</b>	Chemistry of liquid, chemical equilibrium, phase equilibrium, thermodynamics of solution
8.	<b>Spectroscopy:</b>	Spectroscopic methods of analysis such as UV, IR, NMR, chromatographic techniques, thermal methods of analysis
9.	<b>Co-ordination Chemistry:</b>	Crystal field theory, ligand field theory, properties of transition elements, chemical bonding
10.	<b>Green Chemistry:</b>	Principles of green chemistry, significances, applications
11.	<b>Material Chemistry:</b>	Effect of structure on the properties of metals, polymers and inorganic materials

## COMPUTER APPLICATIONS

Sr. No.	Syllabus for entrance Test	
1.	<b>Discrete Mathematics</b>	Propositions and logical operations, Sets, Relations & Digraphs, Order Relations and structures, Optimization, Shortest path algorithm, Tree and Cut-Sets ,Discrete Numerical Function and Generating function , Recurrence relations and Recursive Algorithms , Groups and Rings
2.	<b>Computer Organization and Architecture</b>	Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic. Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface Instruction pipelining, Cache and main memory, Secondary storage.
3.	<b>Programming</b>	Programming in C/C++/Java; Functions, Iteration, Recursion, Modular programming, Scope, Binding; Abstract data types, Class, Object, methods, Object Initialization, Database connectivity, Multi-threaded Programming.
4.	<b>Probability and Statistics</b>	Basic Probability, Random variables and their distributions (Binomial, Poisson, Geometric, Hyper Geometric, Uniform, Negative exponential), Statistical measures, Simulation Techniques, Sampling Techniques, Forecasting Techniques, Dynamic Programming, Inventory Models.
5.	<b>Data and File Structures</b>	Arrays, Stacks, Queues, Linked Lists, Trees and Graphs traversals, Binary search trees, Worst and average case analysis; Mathematical Analysis of Non-Recursive and Recursive Algorithms.
6.	<b>Operating System</b>	Processes and management, Threads, Inter-process communication, Concurrency, Memory management and virtual memory, File systems, I/O systems, Security and Protection, Secondary Storage
7.	<b>Computer Networks</b>	SO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, IP Addressing, Application Layer Protocols: , Transport Layer Protocols . Routers, Hubs, Gate, VLANs, Planning A Network , Network Design
8.	<b>Web Technologies</b>	HTML , XML, XHTML, Host objects, JavaScript , Java Bean, Web Servers and Servlets, JSP , Web Services, Server Database Access, Application and Security
9.	<b>Database Management Systems</b>	ER-model, Relational model (relational algebra, tuple calculus), Database design, normal forms, Query languages (SQL), tuning, Transaction management and concurrency control, Deadlocks, Crash Recovery.
10.	<b>Mobile Computing</b>	GSM and other 2 G Architectures, WAP, Wireless LAN, Mobile IP Network Layer, Various platforms and OS for application development, Next Generation Networks.
11.	<b>Data Warehousing and Mining</b>	Data warehouse Architecture, Data design and Data representation for Data warehouse, ETL, Clustering, Web / Text Mining, Data Visualization, Data Mining Primitives.
12.	<b>Software Engineering &amp; Testing</b>	Software Requirement Specification, Structured Systems Analysis & Design:, Web Project, Fundamentals of Testing, Test approaches and Management, Testing tools.
13.	<b>Cloud Computing And Storage Management</b>	Basics of Cloud Computing, Cloud Administration , Cloud Security Management , Cloud Service Providers ,SAN, NAS
14.	<b>Distributed Systems</b>	Characterization of Distributed Systems and System Models, Process and Inter-process Communication, Distributed Objects and Remote Invocation, Distributed File Systems, Synchronization, Distributed Transactions, Distributed Shared Memory, Current trends, Web Application Security