

## Semester-wise credit requirements

### Course curriculum

Semester	Theory		Lab	Total
	Core	Elective		
I	10	4		14
II	6	6	Lab-2 Energy conversion and storage devices (2.0)	14
III	12 (Thesis- Stage 1)			12
IV	12 (Thesis- Stage 2)			12
Total (I-IV)				52

### Core courses

1. Fundamentals of Electrochemistry  
2. Non Conventional Energy Sources and Environment, 3. Energy Management  
4. Material Synthesis and Characterization, 5. Electrochemical Energy Storage systems. 6. Power Systems Engineering and Converters for Renewable Applications, 7. Energy Audit, 8. Bioenergy, 9. Photovoltaic (PV) Technology, 10. Lab: Energy Conversion and Storage Devices , 11. Industry lecture series, 12. English communication.

### Elective courses

1. Hydrogen economy, 2. Electric Vehicles, 3. Bio Refinery, 4. Energy system analysis, 5. Fuel cell Technology, 6. Petroleum refinery, 7. Bio Refinery, 8. Combustion Engineering, 9. Data analysis tools for experimental research, 10. Statistical design and analysis, 11. Optimization Techniques, 12. Advanced Transport Phenomena, 13. Molecular Thermodynamics, 14. Nuclear Energy, 15. Lab: Laboratory Methods in Electrochemistry and Related Analysis, 16. Data Science.

## Admission procedure

### Eligibility criteria

1. B. Tech/ BE in BT/ Chemical/ Civil/ EE/ ME/ IE/MSME/ M.Sc. with CY/PH with a valid GATE Score
2. GATE Subjects: AE/BT/CH/CE/CY/ EC /EE/ IN/ ME/MN/MT/PE/PH/PI/XE-C/XE-E/XE-F/XE-H/XL-P/ES
3. . Ministry of Education Supported students: These students will either be admitted based on GATE score or if they have a BTech from an IIT, they should have 8.0 or more CGPA.
4. Govt Lab/Industry Sponsored students: These candidates should have first class BTech with a minimum experience of 2 years in any Public industry or any Government research lab. GATE qualification is exempted for them.They will be selected based on a written test and/or an interview. They will not receive any scholarship.
5. Self-Sponsored students: These students should have first class BTech and will be selected based on a written test and/or an interview. They will pay a tuition fee of Rs. 20,000 per credit for 48 credit in 24 months. The admission fee of Rs. 1 lakh will be absorbed in the tuition fee. They will not receive any scholarship.

**The fee structure link is available at the following link on the IITH website.**

[https://iith.ac.in/academics/assets/files/fee/Revised-2022-Jan-June-Fee-Structure-Already-Enrolled%20\\_%2031%20Dec%202021.pdf](https://iith.ac.in/academics/assets/files/fee/Revised-2022-Jan-June-Fee-Structure-Already-Enrolled%20_%2031%20Dec%202021.pdf)

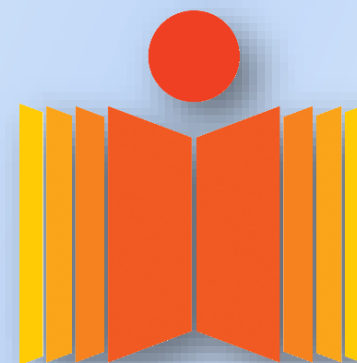
### How to apply and selection criteria?

Eligible Candidates may register and apply through COAP portal. Department may conduct a written exam and/or an interview. Reservations as per the Ministry of Education, Gol norms will be applicable. Total intake under GATE is 5, self-sponsored is 15.



## 2 Year M.Tech. Program In “Energy Science and Technology” (Interdisciplinary)

### Information Brochure



Indian Institute of Technology  
Hyderabad  
Kandi, Sangareddy-502284, TS  
India

## About the program

M. Tech. in Energy Science and Technology (EST) is an interdisciplinary program being offered from the academic year 2020. The goal of the program is to impart and foster knowledge in energy research and development and state-of-the-art approaches to shape the future of energy. Broad areas include, but are not limited to: Fossil Fuels, Power Engineering, General Energy, Renewable Energy, Energy Storage, Nuclear Energy and so forth. The intake per year under this 2-year M.Tech. program is 5 seats (MHRD) + 15 (Sponsored).

## About the department

This is a interdisciplinary course started from the academic year 2020-2021 at IITH. The Department of Chemistry is initially coordinating this course. Currently, M.Tech. in EST comes under Centre for Interdisciplinary Program. Faculty members from different departments across the Institute with expertise in Energy, Materials and Technology serve as instructors for the diverse curriculum.

## About the Institute

IIT Hyderabad is one among the 2nd generation of IITs started by the Govt. of India. Today IITH offers 11 B.Tech programs, 1 B.Des Program, 3 M.Sc programs, 18 M.Tech programs, 1 M.Des program, 1 MA Program and 15 Ph.D. programs in all branches of engineering, science, liberal arts and design. The very foundation of IIT Hyderabad is based on research and innovation. The vibrant research culture is evident from the number of patents and publications that IITH is generating. The institute has over 250 faculty and around 3400 students. IITH has a unique holistic educational ecosystem that offers interactive learning with a highly, flexible academic structure and encourages cutting-edge research, strong industry collaboration, and entrepreneurship.

## EST facilities

- Materials synthesis apparatus
- Autoclave reactor, fixed bed reactor
- Battery assembly and electrochemical characterization
- Solar cell fabrication and characterization
- Materials characterization: Scanning Electrochemical Microscopy (SECM), XRD & SAXS, SEM-EDAX, TEM, XPS, FTIR, UV-vis NIR, Atomic Force and Raman Microscopy, Chemisorption, GC, GC-MS, LCMS, Thermal Studies (TGA, DSC)
- DC-DC converters, DC-AC converters
- Three-phase voltage source converters
- Bidirectional converters
- Multipole multiphase induction machine

## Placements (2021-22)

**Suzuki motors, ZF India Pvt Ltd, Baker Hughes, Rashtriya Chemicals and Fertilizers Limited (RCFL)**

## Industry Lectures

>25 Industry lecturers organized during academic years (2020-22). This includes Green Avni Solutions LLP, Hyderabad; Roshan Energy Technologies Pvt. Ltd. Hyderabad; HBL, Hyderabad; High Energy Batteries (India) Ltd.; ABB Global Industries and Services Pvt. Ltd., Hyderabad; Tata Steel; Log 9 Materials; Godi India Pvt Ltd, Hyderabad; BPCL, HPCL, BHEL, Mahindra& Mahindra; Sravathi Advance Process Technologies; Pur Energy Pvt. Ltd.; Rechargion Energy Pvt Ltd; ARCI-Chennai; Arna Immuno Ingredients Private Limited; and many more.

## EST faculty members

### ❖ Dr. Debaprasad Shee (PhD-2008, IIT Kanpur)

Research area: Catalysis over supported metals and metal oxides, Nanostructured catalysts, Structure property correlations, Fuels and chemicals from renewable sources and reaction engineering

### ❖ Dr. Praveen Meduri (PhD-2015, The University of Louisville)

Research areas: Multiscale materials, Energy Storage and Conversion, Renewables

### ❖ Professor M. Deepa (PhD-2004, CSIR-NPL, New-Delhi)

Research areas: Materials Electrochemistry, Quantum Dot Solar Cells, Beyond Li-ion Batteries & Electrochromic Devices

### ❖ Professor Ch. Subrahmanyam (PhD-2003, IIT Madras)

Research areas: Heterogeneous Catalysis, Nanomaterial Synthesis with Energy and Environmental Applications

### ❖ Dr. Surendra K. Martha (PhD-2006, IISc Bangalore)

Research areas: Materials Electrochemistry with special emphasis on Li-ion, Na-ion, Lead-acid Batteries, Ultracapacitors and Recycling Batteries

### ❖ Dr. Rupesh Ganpatrao Wandhare (PhD-2014, IIT Bombay)

Research areas: Power Electronics, Renewable Energy Sources, Distributed Energy Generation Standalone and Hybrid Energy Generation

### ❖ Dr. Siva Kumar K (PhD-2010, IISc Bangalore)

Research areas: Multilevel Inverters, Open-end Winding Induction, Motor Drives, Switched Mode Power Conversion, Microgrids, Power Quality and Control.

### ❖ Dr. Pradeep Kumar Yemula (PhD: IIT Bombay)

Research areas: Smart Grids, Power System Control Centers, Information Technology Architectures, Ontologies for Power System Events, Common Information Model (CIM), Interoperability and Standards

### ❖ Professor Suhash Ranjan Dey (Ph.D. University Paul-Verlaine Metz, France (2006))

Advanced Multi-Functional Nanostructured Materials/High Entropy Alloys, Combinatorial Alloy Design of Emerging Materials

### ❖ Dr. Atul Deshpande (PhD-2004, Max Planck Institute of Colloids and Interfaces)

Research areas: Nanostructured Materials for Energy Conversion and Storage, Catalytic and Biomedical Applications

### ❖ Dr. Sai Santosh Kumar Raavi (Ph.D. 2009: University of Hyderabad)

Research areas: Optics and Spectroscopy of Energy Conversion Materials

### ❖ Dr. Narendra Kurra (PhD. 2013 JNCASR, Bangalore, India)

Research areas: Materials (electro)chemistry, Two-dimensional materials Energy Storage, Energy Nanoscience & Technology, Materials Processing



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