

Frequently Asked Questions (FAQs)
B. Tech. in Energy Engineering
Department of Energy Science and Engineering [DESE]
IIT Delhi

1. What is the scope of the B. Tech. programme in Energy Engineering offered by the Department of Energy Science and Engineering (DESE), IIT-Delhi?

Energy is central to every challenge humanity is facing now, directly or indirectly leading to significant transitions in the energy landscape. Currently, the focus is on the decarbonization of the energy sector (green and clean fossil fuel technologies); Energy Storage, Green hydrogen, CO₂-free energy systems (like nuclear fission / fusion technologies and renewables); carbon capture, storage and use; supply and demand side management with integration of e-mobility, renewable energy to electric grid. The energy transition from conventional fossil fuels to clean and green energies would require lot of broad-based inter-disciplinary engineering, policy-making and energy economics. Therefore, there is a critical need for studying, discovering, acquiring, analyzing and developing technologies / knowledge-base in these areas. The B. Tech. programme in Energy Engineering offered by DESE, IIT-Delhi, is prepared keeping in mind the needs of energy sector in the Indian and International context.

IIT Delhi has a provision of Minor Areas in emerging specialized domains (both from within or outside the department), which high performing students can choose the same based on their passion, interests, aptitude, and future career goals. Such students would obtain a B. Tech degree in Energy Engineering with specialization in the Minor Area Specialization chosen. There is also a possibility of doing a master's in advanced standing mode, earning two degrees in a period of five years.

2. What are the career options after successful completion of B. Tech. in Energy Engineering from DESE, IIT-Delhi?

The seventh of the seventeen Sustainable Development Goals (SDG7) established by the United Nations General Assembly in 2015 calls for “affordable, reliable, sustainable and modern energy for all” by 2030. Three important aspects of sustainable development are decarbonisation, energy access and equity. Energy is in a critical transition from conventional to clean and renewable energy resulting in ample placement opportunities in energy sectors. Energy transition being one of the top priorities, energy sector and its offshoot are expected to provide numerous career opportunities in the coming decades which include (but are not confined to) jobs in industry, consulting, start-ups & entrepreneurship, Government Sector, Public sector Undertakings (PSUs), Banking, DISCOMS, Industry Trade Association (CII, FICCI, etc.) *etc.* across various interdisciplinary areas of the energy sector.

3. Are there any internship opportunities during the course tenure?

The Institute facilitates two internship opportunities in Industry, PSUs and Consulting / Research Organizations for interested students during their Bachelor Degree Programmes after second year (For details, please refer to the Courses of Study: Section 9.6 in the following link: <https://home.iitd.ac.in/curriculum.php>).

4. What is the basic course structure of the programme?

Going with the primary philosophy of imparting science-based engineering education, the course structure is the amalgamation of courses from different focussed areas, updated and highly relevant for the present-day energy engineer. Further, the course structure inherently provides flexibility to the students to take up courses within and outside the department as per his / her strengths / choices. Approximately, 50 - 60% of the courses are to be taken from the parent department and the remaining from other departments. The course structure of the B. Tech. programme in Energy Engineering encompasses the rich spectrum of all energy technologies currently being developed, including carbon-free and green energy sources. The curriculum ensures that the students gain a robust grounding in the basics of energy studies. In addition, the students will also be trained in energy resources (fossil fuels, nuclear fuels, renewables), generation, transmission, distribution, storage, transportation, energy management & data analytics, energy economics & planning, hydrogen economy, grid integration, power electronics and AI & IoT for energy systems. The course is augmented with practical and innovative design components.

5. How relevant is the coursework for the current market/research scenario?

Given the current global initiatives for a rapid shift towards decarbonisation of energy sector and development and deployment of sustainable energy solutions, the coursework will equip the young minds with the adequate knowledge, skills, and competence to participate in this sustainability campaign on both industrial, consulting and research fronts. As the effect of conventional resource shortage and climate change is pervasive throughout the globe, the coursework offered in this programme is the need of the hour to develop highly skilled professionals capable of offering innovative solutions and executing novel ideas to safeguard human livelihood in the future.

In the current paradigm, energy sector presents excellent opportunities for technology incubation allowing students to take up start-up activities and become successful entrepreneurs. Besides developing appropriate technological interventions for much needed energy transition, they can also contribute towards developing energy analytics, smart energy management solutions, financing, policy making and facilitating access-to-energy for all in an equitable manner.

6. How does the course structure of this program differ from a regular B.Tech. in Mechanical Engineering/Electrical Engineering/Chemical Engineering?

While the course structure of the B. Tech. programme in energy engineering encompasses all relevant aspects from the domains of mechanical, electrical and chemical engineering, it aims to equip the students with the necessary knowledge in the areas of energy analytics, smart energy management solutions, financing, policy making and facilitating access-to-energy. Typically, the core courses in the programme would cover approximately 20% Basic Sciences, 20% Electrical, 15 % Mechanical and 5 % Chemical apart from 40% in the Energy-related topics.

7. What are the other facilities available for students?

IIT Delhi has a Hybrid High-Performance Computing Facility [Weblink: <https://supercomputing.iitd.ac.in/>], Central Research Facilities (CRF) [Weblink: <https://crf.iitd.ac.in/facility.html>], a Nano-Research Facility (NRF) [Weblink: <https://nano.iitd.ac.in/>], etc. which are available for use by the student and faculty of IIT Delhi.

Apart from these facilities, the students are also having the opportunity to join student-related and student-driven cultural activities (like the Dramatics Club, Literary Club, Dance Club, etc.) and technical activities (like Robotics Club, Formula Society of Automotive Engineer, etc.) [Please visit <https://brca.iitd.ac.in/> for more details].

8. Scope of post graduate studies after B. Tech. in Energy Engineering?

Students on successful completion of the B. Tech. programme can pursue their post graduate studies in the field of energy in Top QS Ranking Institutes (for example Stanford University, USA; Princeton, USA; MIT, USA; Berkeley, USA; Wisconsin, USA; Aachen University, Germany; KTH Stockholm, Sweden; University of NSW, Australia; UQ, Australia; NTNU, Norway; University College London [UCL], UK; NTU, Singapore; etc.).

Students will also be suitable candidates for admission into a large variety of prestigious graduate programmes in the areas of energy - environment interaction, Energy Resource Engineering, energy policy and planning, energy systems, and data analytics.

9. What level of pedagogy can be expected at the DESE, IIT-Delhi?

The department had the privilege of initiating a Ph. D. programme in energy in 1977 and started the first M. Tech. programme in the country in the field of energy in 1981. Currently, the department is offering three M. Tech. programmes including one being sponsored by the International Solar Alliance (ISA) for students from foreign countries.

The department has competent expert faculties in various relevant domains. The department also has laboratories to provide hands-on experience to the students about the scientific tools that would be highly instrumental while being inducted into industries and research organizations. Energy being an interdisciplinary subject, the student also will have

the opportunity to benefit from the faculty expertise and the laboratory facilities established by other departments of IIT Delhi.

10. What would be the placement pay-package for the B.Tech. in Energy Engineering programme?

The pay package is highly dependent on the market demands which can vary from year-to-year. However, with the global emphasis on energy & environment one envisages a large number of core companies to hire students from this department. Some of the major companies could be Schnieder, Siemens, Bosch, Thermax, Nissan, JP Morgan, General Motors (GM), General Electrics (GE), Sterile Power, Tesla, ABB, Deloitte, Andritz, LG Chem, Smart Joules, Abbott, LG Electronics, Samsung, Renault, Tata, KPMG, IOCL, GAIL, BHEL, NTPC, Boston Consulting Group (BCG), PWC, Ernst & Young, EIL, as well as many other relevant organizations / Institutions and Industries engaged in Energy sectors.

11. Who are the notable alumni of IITD working in Energy?

The alumnus of our department has worked with World Bank, International Finance Corporation, International Institute for Applied Systems Analysis, Asian Development Bank (ADB), Standard Chartered, CitiBank, International Atomic Energy Agency (IAEA), UNDP, GE, Schnieder, Siemens, Deloitte, PWC, ABB, Ernst & Young, Boston Consulting Group (BCG), Sterile Power, IOCL, NTPC, ONGC, BHEL, HPCL, GAIL, *etc.*