Department of Energy Science and Engineering

MSc – PhD Dual Degree in Energy – Admissions 2017

Department Profile

The cost effective, energy efficient, sustainable and reliable energy systems is the current global requirement. The major challenges faced by energy systems, need fundamental research in basic sciences and its applied aspect, specifically materials development and devices. Energy Systems Engineering (ESE) was founded in 1981 as an interdisciplinary programme (IDP) at IIT Bombay with the vision to develop sustainable energy systems for the future and manpower with expertise in energy sector. As an IDP, MTech and PhD programmes were offered. It grew into the Department of Energy Science and Engineering (DESE) in the year 2007. The department is now a unique blend of both engineering and science students as well as faculty, with the aim to conduct cutting edge research and provide innovative solutions in terms of materials and devices for solving the energy problems.

DESE offers a Dual Degree BTech-MTech (Energy Engineering), an integrated MSc-PhD programme in Energy, MTech (Energy Systems Engineering) and PhD programmes. Currently, there are 22 core faculty and about 30 associated faculty members from across the institute and more than 400 students in the department. The department's research activities focus on developing cost effective renewables (e.g. thin film photovoltaics, low cost solar thermal industrial heating and wind), energy conversion and storage (e.g. batteries, fuel cells, hydrogen storage and IC engines) and energy efficient devices and systems (e.g. process integration, benchmarking, heat pumps, trigeneration, controllers and power electronics, micro grids). DESE has significant industrial partnerships in the form of sponsored labs from Cummins Engines Lab, ONGC Underground Coal Gasification Facility, Forbes Marshall Energy Efficiency Lab; sponsored projects from Applied Materials, Cummins, Forbes Marshall and offers Continuing Education Programmes for industry and several industry sponsored student fellowships.

Course Details

The Dual Degree MSc-PhD programme plans to develop researchers who can provide fundamental inputs and possible solutions to meet the challenges of the energy sector. The intake is through JAM (a total of 18 seats with 7 from JAM- Physics, 7 from JAM- Chemistry and 3 from JAM- Mathematics and 1 open for ST candidates from Physics / Chemistry / Mathematics) and an interview. The core courses provide a background of analytical and laboratory techniques required to conduct research as well as understanding of energy systems. Several electives are provided in the curriculum to enable the student to specialize in their area of interest and gain expertise in the relevant field.

The rising energy demand, finite fossil fuel reserves and global environmental concerns requires fundamental research and breakthroughs in energy generation, conversion, transmission & distribution, utilisation, disposal and implications. Some of the key research areas of our department
faculty includes solar thermal systems both at lab and industrial scales, conventional energy sources (coal gasification and combustion), solar photovoltaics (materials, devices, power plants, performance and reliability etc.), energy conversion both at materials and device level (batteries, fuel cell and hydrogen storage), electrical energy systems including transmission and distribution (microgrids, smartgrids, grid integration etc.), energy management, energy conservation and energy efficiency, integration of renewable resources with fossil energy, nuclear and wind energy. The department is leading and involved in various national and international collaborative projects. A DESE led consortium had built a MW scale solar thermal power plant as a national testing cum research facility. The department has also set up a National Centre for Photovoltaic Research and Education (NCPRE) with the support from the Ministry of New and Renewable Energy (MNRE).

**Minimum Eligibility criteria for admission to the MSc–PhD dual degree programme in Energy**

The candidate must have Bachelor’s degree in Science (BSc or equivalent) of minimum three years duration, with any one of Chemistry, Mathematics and Physics for two years/four semesters and any one of the remaining two subjects for at least one year/ two semesters with the following minimum aggregate:

a. 55% or CPI 5.5/10 for GN and OBC-NC,

b. 50% or CPI 5.0/10 for SC/ST

The intake to this programme is through JAM followed by interview conducted by Department of Energy Science and Engineering. A JAM score cut-off (in CY/PH/MA) will be announced based on which students will be shortlisted candidates will be intimated via email regarding the interview schedule.

**Important dates for the admission process**

- Online application portal open: 3rd April 2017 to 17th April 2017
- Shortlisted candidates list displayed: 24th April 2017
- Interviews: 15th and 16th May 2017
- Declaration of first admission list: 31st May 2017
- Declaration of second admission list: 15th June 2017
- Declaration of third admission list: 30th June 2017