



**Pandit Deendayal Petroleum University (PDU), Gandhinagar**

**School of Technology**

**Department of Nuclear Science & Technology**

**M. Tech in Nuclear Science and Technology**

**About the Program**

The civil nuclear cooperation agreements of India with the USA, Russia, France, Kazakhstan and the Nuclear Suppliers Group was signed in the last quarter of 2008 which paved the way for the Department of Atomic Energy (DAE), Govt. of India to import light water reactor (LWR) technology and uranium ore concentrate and fuels. Based on these developments, the DAE announced an ambitious expansion programme of nuclear power, linking indigenous pressurized heavy water reactor (PHWR) technology, imported uranium and imported LWR technology from reputable reactor vendors from France, Russia and USA. Soon after, the nuclear engineering (NE) course of PDU was started in 2009 at the post graduate level, with the expectation of the rising employment opportunities of post graduates in nuclear engineering in the government and private sector organizations involved expanding nuclear power programme in India. Hence, the focus of the course has been on nuclear power reactor technology relevant to the nuclear power programme in India.

In 2017, the course is reoriented and introduces more science base subjects of nuclear energy, particularly in the area of radioisotopes and applied radiation sciences in the field of food and agriculture, medicine and healthcare and characterization and testing of materials. In fact, the impact of nuclear energy in this non-power sector is substantially larger than in the sector comprising nuclear power both in terms of revenues yielded and employment opportunities in India and abroad. In addition, the course would also include subjects like Nuclear Power Plant, Nuclear Fusion and Plasma technology, Nuclear Safety & Security and Nuclear Materials Engineering in great details.

These changes in curriculum will enhance the employment opportunities as “nuclear radiation engineers” in SMEs in private sectors dealing with:

- i) Radiation induced mutation in nuclear agriculture,
- ii) Food irradiation and preservation,
- iii) Sterilization of hospital products for medical procedures
- iv) Radiopharmaceuticals for diagnosis and therapy
- v) Non-destructive evaluation of welds and
- vi) In-service inspection of structures based on nuclear techniques like gamma radiography and image analysis and in Multi-speciality hospitals and diagnostic centres dealing with radioisotopes as “health & safety officers”.
- vii) The course will also train and promote self-employment as “start-ups” in nuclear agriculture, food irradiation and preservation, radio-pharmaceuticals and non-destructive evaluation of materials and structures.

**Vision:** The vision of the Department of Nuclear Engineering, PDPU is to provide world class educational opportunities for graduate students interested in advancing the frontiers of nuclear science and engineering and in developing power and non-power applications of nuclear technology for the benefit of society and the environment. We prepare our students to make contributions to the scientific fundamentals of nuclear fission, fusion and nuclear radiation; to the sustainability of Food , Energy & Water (FEW) security, without degrading the environment; to nuclear safety, security and proliferation –resistance of dual use nuclear materials; to use of nuclear radiation and radioisotopes in food and agriculture, medicine and healthcare, non-destructive evaluation of materials in industry and in research; and to the integration of nuclear systems into society and the natural environment.

### **Who is eligible to apply?**

“BE/B.Tech or equivalent in any discipline or M.Sc. in any discipline with minimum 60% or CPI/CGPA of 6.5 on a 10 point scale as an aggregate of all the semesters”.

### **About Curriculum**

The M Tech, Nuclear Engineering course curriculum is prepared and continuously reviewed and upgraded, keeping employment opportunities in mind, in consultation with leading experts from the Department of Atomic Energy (DAE), Government of India, nuclear industry, organizations involved in non-power applications of nuclear energy and experts in the field of nuclear safety, security and safeguards. The students spend one year in carrying out project work related to nuclear energy in DAE institutions like Bhabha Atomic Research Centre (BARC) Mumbai, Institute for Plasma Research (IPR) Gandhinagar, Indira Gandhi Centre for Atomic Research (IGCAR) Tamilnadu and other private sector organizations like L&T having an active programme in nuclear energy. The students are exposed to training on nuclear safety and security in collaboration with DAE units and reputable overseas universities like the Texas A & M University, USA

Department arranges lectures by highly experienced visiting faculties from Bhabha Atomic Research Centre (BARC) Mumbai, Institute for Plasma Research (IPR) Gandhinagar, Nuclear Power Corporation of India Limited (NPCIL) to give in-depth understanding on subjects. DNST also arranges industrial visit to different nuclear research institutes and Industry to give exposure to students regarding present technology and to understand the trends in research and development of nuclear science engineering.