New Undergraduate Programs at IIT Jodhpur
Suril Vijaykumar Shah

Indian Institute of Technology Jodhpur is committed to educational excellence through a strong student-focused educational experience and to provide quality education with the contemporary and highly professional curricula with interdisciplinary breadth. With this focus, IIT Jodhpur has started four new B.Tech. Programs from A.Y. 2020-21 and the unique features of these programs are highlighted through this article.

B.Tech. in AI & Data Science

While Artificial Intelligence aims to create machines to act with higher levels of intelligence and emulate the human capabilities of sense, comprehend and act, Data Science is the art of generating insight, knowledge and predictions by processing data pertaining to a system or a process. The future industry will be driven by the synergistic combination of data science and artificial intelligence. IIT Jodhpur offers a unique undergraduate program in Artificial Intelligence and Data Science from the academic session 2020-21. The curriculum includes courses in computer science, mathematics, artificial intelligence, machine learning, data science, and their applications in various domains. The course structure also provides opportunities to the students to explore specialized areas like visual computing, socio-digital realities, language technologies, robotics, and Artificial Intelligence of things. Building on the core background of AI and Data Science, students will have the opportunity to pursue MBA (Tech) in the fifth year as a dual-degree option in the School of Management and Entrepreneurship. An interesting feature of the B.Tech. program is the opportunity for the interested students to choose a minor area which would prepare them for an entrepreneurial career in the field of AI and Data Science. Under the broad umbrella of IIT Jodhpur’s unique proposition of AI for everything, students belonging to this academic program in B.Tech. in AI and Data Sciences will be part of scientific innovations for solving local and global engineering and social problems in close collaboration with industry. Students will be part of institute’s initiatives for ensuring better life and livelihood for all with AI as the enabling force. Unlike many other institutes, IIT Jodhpur would like AI and Data Science students to explore transdisciplinary research agenda fostering collaborative opportunities across all the departments of IIT Jodhpur and partner organizations.

B.Tech. in Civil and Infrastructure Engineering

IIT Jodhpur offers a unique undergraduate program in Civil and Infrastructure Engineering commencing from the academic year 2020-2021. The rapidly urbanizing society and increasing quality of life, demand reliable and intelligent infrastructure systems that cater to the needs of the society, from an individual to a community level. Consequently, the Civil and Infrastructure industry has undergone profound changes and is constantly evolving. The new-age designs and innovations in civil and infrastructure industry can only be driven by a group of engineering graduates who have multidisciplinary training and a sound understanding of emerging technologies. From this standpoint, the IIT Jodhpur has made a stride to reimagine the course structure that integrates and incorporates the elements of conventional Civil engineering with advanced transformative technologies such as Artificial Intelligence (AI), Cyber-Physical System (CPS), and Digital Twins (DT). Additionally, a major thrust is also planned on the design, implementation, and maintenance of large-scale integrated infrastructure systems across different domains. The curriculum includes courses from the major domains, namely, Geotechnical Engineering, Water Resources Engineering, Construction and Infrastructure, Environmental Engineering, Transportation engineering, Structural Engineering, Smart infrastructure Technology, and Infrastructure Systems. The courses would provide an expanded but holistic understanding of different civil and infrastructure systems and an in-depth understanding of the differences, similarities, and relations between different scales and components of it. They are designed in a unique way to gain the ability to take a multidisciplinary approach to problem-solving, and willingness to go beyond conventional paths. The course structure will also help students to have a thorough understanding of green and sustainable materials, practices, and principles for designing resilient infrastructure systems using safe methodologies coupled with advanced technologies such as AI, DT, CPS, and Internet of Things (IoT).
World has changed in the last few months and is facing several new challenges due to COVID-19 pandemic. None the less, this has also opened up new opportunities in Chemical Engineering and for future Chemical Engineers. Through the B.Tech. program in Chemical Engineering, IIT Jodhpur is making a conscious effort to chart out a new path and establish itself to become a leading institute in this new genre of Chemical Engineering Education. The objective of the B.Tech. program in Chemical Engineering at IIT Jodhpur is to empower students with emerging concepts in chemical engineering with a solid base in fundamentals like chemical reaction engineering, fluid mechanics, heat transfer, mass transfer, transport phenomena, process control, and thermodynamics. In addition, students will have exposure to several newer areas including intelligent process engineering, molecular engineering, sustainability, complex fluids and interfacial Engineering, and biochemical engineering. Translation of molecular information into the discovery of new products and processes will play an important role. With Industry 4.0 transforming the chemical industry, AI and IOT for chemical engineering forms an integral part of the new curriculum. In summary, Chemical Engineering program at IIT Jodhpur has been formulated to produce future-ready chemical engineers capable of meeting new industrial challenges. The program has several unique opportunities and flexibilities inbuilt for the students, which are quite different from elsewhere. As a part of 4-Year program, a student can do department specialization in (i) Process Engineering Intelligence; (ii) Molecular Engineering; or (iii) Sustainability. The student has an option to do Minor in (i) Management; (ii) Entrepreneurship; (iii) Data Science; or (iv) Interdisciplinary Areas such as AI, Robotics, etc. The student will have the choice to opt for a double B.Tech. within the 4-Year program through extra credits. Option to convert B.Tech. into 5-Year B.Tech.+MBA(Tech.) or B.Tech.+M.Tech. is also available to the student in the 7th semester. An important option to pursue entrepreneurship and engineering innovation is available for the willing student in the 8th semester. B.Tech. in Chemical Engineering at IIT Jodhpur is full of opportunities and flexibilities for the students. Sky is the limit.
B.Tech. Materials Engineering curriculum is designed to cover the breadth and adequate depth through foundational courses, program compulsory courses, program elective courses, and open electives. Courses, such as, Scientific Computation, Machine Learning, Data Structure and Algorithm, Signals and Systems, and Computational Materials Modelling are made integral part of the B.Tech. curriculum to equip the students with relevant skill sets required for the emerging industry-demanding areas of Computational Materials Design, Process Modelling, Process Control, Structural Health Monitoring and Predictive Maintenance, etc., to name a few. Courses such as Electronic Materials, Materials for Energy Storage and Conversion, Smart Materials have been made program compulsory keeping in view the increasing demand of new functional materials in Electronics and Energy sectors. The program compulsory and program electives are offered from a wide basket of courses from four major streams of Materials Engineering - Structural Materials, Functional Materials, Computational Materials Engineering, and Process Metallurgy. For further depth in the curriculum, the Department also offers optional specializations in these major streams. The students can choose either a department specialization or an interdisciplinary specialization in demand-driven areas such as Artificial Intelligence, Energy Materials, Smart Healthcare, etc., and may do B.Tech. project in the area of specialization. The unique undergraduate program offers several options to the students, who based on their interest can choose department specialization, interdisciplinary specialization, Minor in areas such as Data Science, Management, and Entrepreneurship. The students can also opt to do B.Tech.-MBA dual degree. The B.Tech. program offers a unique flexibility to students to plan their career path based on their interest while taking industry requirement into consideration. The students will be part of technological innovations for solving engineering and social problems through materials solutions in close collaboration with industry.

Dr. Suril Vijaykumar Shah
Associate Dean (Academics – UG Programs), IIT Jodhpur
Email: ad_academics Ug@iitj.ac.in