GSFC UNIVERSITY
EDUCATION RE-ENVISIONED

Vigyan Bhavan, Fertilizernagar, Vadodara

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log on to www.gsfcuni.edu.in

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GSFC UNIVERSITY
EDUCATION RE-ENVISIONED

School of Technology (SOT)

MECHANICAL ENGINEERING

Specialization in
- Robotics & Automation
- Smart Manufacturing

INDEX:

B. Tech. in Mechanical Engineering (40 intake)

ABOUT THE PROGRAM:

Mechanical engineering is a discipline of engineering that applies the principles of physics and materials science for analysis, design, manufacturing, and maintenance of mechanical systems. It is the branch of engineering that involves the production and usage of heat and mechanical power for the design, production, and operation of machines and tools. This includes solving today's problems and creating future solutions in health care, energy, transportation, world hunger, space exploration, climate change, and more.

The program is well equipped with new state of art labs to boost up high quality research & learning activity. On the other hand, the computational research activity of the program is also equally strong by the help of several software such as SolidWorks, Ansys, and MATLAB.

VISION

To be recognized as a provider of high-quality education in the field of Mechanical Engineering that enables graduates to meet the needs of society and to craft intellectually-adept research centers with world class competency and cutting-edge proficiency.

MISSION

- To educate, prepare and mentor students to excel as professionals.
- To provide the facilities and environment conducive to high quality education to get diverse careers as well as research in the field of Mechanical Engineering.
- To engage the students in academic as well as scholarly activities, which strengthen the program reputation in the global market.

PROGRAM SPECIALIZATIONS

B. Tech Mechanical Engineering Program offers specialization in the following areas at the School of Technology, GSFC University, with an Intake of 40 seats.

Smart Manufacturing:

Smart Manufacturing, consisting of courses, provides an in-depth look at Industry 4.0 – manufacturing's "Fourth Revolution" of digital-based technology advances. The following courses are offered under this specialization: **Advanced Manufacturing, Additive Manufacturing, Product Design and Value Engineering, Computer-Aided Engineering, And Product Lifecycle Management.**

Robotics & Automation:

Robotics and Automation use control systems and information technologies to reduce human work's need to produce goods and services. In the scope of industrialization, automation is a step beyond mechanization. A specialization in this area may lead to potential career opportunities in manufacturing, research and engineering, agriculture, mining, nuclear, power-plant maintenance, and various other areas. As the recent global career trend in robotics suggests, fields as diverse as surgery, modern warfare and nanotechnology have registered a remarkable increase recently in their demand for technical experts and research in robotics. The following courses are offered under this specialization: **Introduction To PLC, Robotics, Mechatronics, Factory Automation, And Computer Integrated Manufacturing.**

PROGRAM SPECIFIC OUTCOMES:

The graduates of Mechanical Engineering course will have:

- An ability to analyze and model physical systems or components using (apply knowledge of) mathematics (including multivariable calculus and differential equations), basic science and engineering.
- An ability to design and conduct experiments, as well as to analyse and interpret data.
- An ability to design and realize a physical system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to engage in lifelong learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Gender Friendly
Lush Green Campus

Golf Course

Hostel Facilities

Library with Digital Resources

Medical Facilities

New Lab Building

Sports Facilities

Swimming Pool

Wi-Fi enabled campus

LABORATORY FACILITY:

1. Computer Aided Design Lab.
2. Theory of Machines Lab. / Dynamics of Machines Lab.
3. Metrology Lab.
4. Hydraulics Lab.
5. Engineering Mechanics Lab.
6. Heat Transfer Operation Lab.
7. Mechanics of Solid Lab.
8. Fluid Mechanics Lab.
9. Engineering Workshop
10. Robotics lab
11. Refrigerator and air conditioners
12. Drawing hall

STRENGTH OF THE PROGRAM:

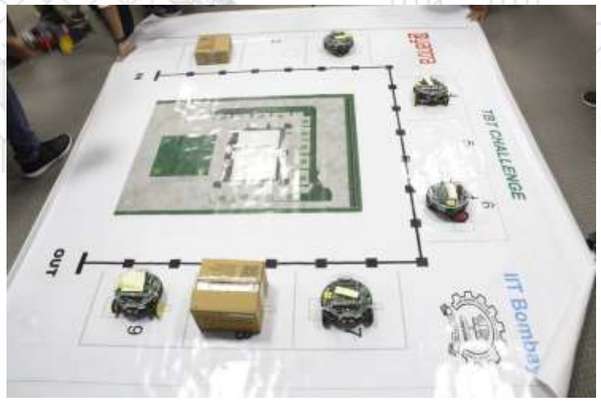
- A unique Medical College Model for imparting practical hands-on experience in association with GSFC Ltd.
- Program has a good blend of highly motivated, young and experienced faculty members.
- Qualified and Experienced faculty members, who strive to impart quality education
- Well established laboratories and state of the art computational facilities
- Industrial internship and training for students and faculties
- Well established Research Culture
- Innovative alliances with industries and academia
- Full semester major project at industry/ training/R&D organizations
- Faculty and students have won several prestigious awards and recognitions

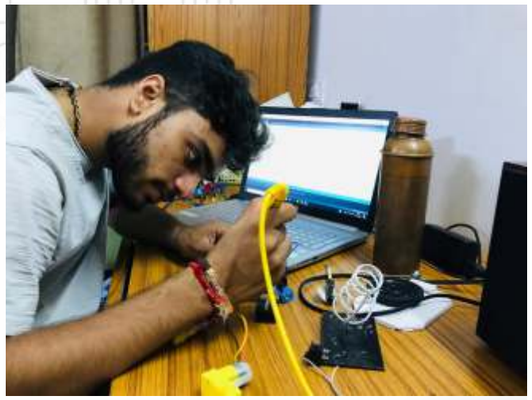
SYMPOSIUM

The objective is to discuss the emerging trends, skills required and to propose different variants which can be introduced in the curriculum. It aimed to explore the emerging areas, future skills required for engineering graduate and survey universities offering Specialization in mechanical engineering program.

Emerging Areas in Mechanical Engineering:

Robotics and Mechatronics:





Mechatronics is essential for several key areas in mechanical engineering, for example robotics, intelligent motion control, automation, flexible manufacturing systems (FMS), CAD/CAM, automated guided vehicles (AGV), data communication systems, actuators, and sensors.

Additive Manufacturing

3-D printing has emerged as a frontier technology in recent times in the manufacturing sector for its obvious benefits. 3-D printing is an additive manufacturing process where parts are fabricated layer by layer from 3-D CAD models. This technique has immense potential for the future.

INDUSTRIAL LINKAGES:

Gujarat State Fertilizers & Chemicals Limited · GNFC · GACL Promoting Green Technology · SkillPlus Enhance Your Skills

L&T · apollo TYRES · Siemens Centre Of Excellence, The M.S. University of Baroda · CED Since 1979 ISO 9001: 2015 certified

EDP Module-II, by The Centre for Entrepreneurship · ISHAN · INOXCVA HISTORICALLY FUTURISTIC · JNSF INDUSTRIES

steag ENERGY SERVICES · UltraTech CEMENT · IndianOil · VARUN ENGINEERING

L&T Hydrocarbon Engineering · Jewel Consumer Care · Makson · MORIS Since 1975

OPaL · SETCO AUTOMOTIVE LTD · SCHWARTZ TURBOTECH (PVT. LTD.) · Standard Radiators Pvt. Ltd., Vadodara

THERMAX · VTV · SOLIDWORKS · ankur

ANUPAM · Gujarat Industries Power Co. Ltd. · heubach COMPETENCE IN COLOR

RECOGNITION:

GSFC University is established under Gujarat Private Universities Act, 2009, as amended by Second Amendment Act, 2014 and the Gazette Notification was issued by the Education Department, Govt. of Gujarat on 28th November, 2014.

AWARDS/ACHIEVEMENTS

Student Achievements:

- Within a short span of a year 3 successful projects from the program received funding from SSIP and worked towards becoming a successful startup.
- Students of the program secured admissions in IITs, top ranking business schools and prestigious foreign universities.
- Students of the program secured placements in reputed companies like Reliance, GSFC Ltd., Siemens, Deepak Nitrite and others.
- 7 students won top 3 prizes in inter university quiz competitions at pan India level organized by reputed professional engineering group Indian Society of Heat Ventilation & Air Conditioning Engineers (ISHRAE).
- GSFC University achieved 6th rank at pan India level Go kart competition.

Faculty Achievements

- Research Paper publications by faculty members in Peer Reviewed reputed National/ International Journals/Books
- Faculty members invited to deliver the expert talks at highest forums like Technical Education Quality Improvement Programme of Government of India (TEQIP) assisted by World Bank, other institutes, professional societies and other platforms
- Reviewer of reputed International Journals/Books
- Mentored students for successful startups

MAJOR ACTIVITIES:

Research:

The faculty members are highly qualified and involved in the collaborative/joint projects with Industry / R&D institutes. A good number of research papers are published in refereed international as well as national journals of repute by faculty members and research scholars.

Faculty Development Programmes:

The teachers are encouraged to update their knowledge and skills through various training and learning modes. Constant efforts are being made by the Management to achieve this aim.

Industrial internship:

Industrial internship is an integral part of learning. It makes them industry ready to face real world problems. Students are placed at various industries for a period of 4 weeks and under supervision and guidance of respective industry personnel.

Students also go to Industry for full time projects in 7th & 8th Semesters. The faculty guide is assigned during the same period for regular monitoring and evaluation.

MEMORANDUM OF UNDERSTANDING

GSFC University has MoUs with GIDM, NASSCOM, PTC, AToS, and foreign universities:

- MOU between GSFC University and **Gujarat Institute of Desert Ecology, Bhuj**
- MOU between GSFC University and **Gujarat Knowledge Society** for implementation of the Student Startup and Innovation Policy (SSIP) of Government of Gujarat
- MOU between GSFC University, Vadodara and **Airport Authority of India (AAI)**
- MOU between GSFC University, Vadodara and **University of Maryland, USA**
- Letter of Intent (LOI) Between GSFC University, Vadodara and **Victoria University, Australia**
- Letter of Intent (LOI) of Mutual Cooperation Between GSFC University, Vadodara and **University of Dubai, UAE**
- MOU between GSFC University, Vadodara and **AIESEC, Baroda**
- MOU between GSFC University & GSFC Ltd for Industrial Internship.
- MOU between GSFC University and **Gujarat Council on Science and Technology (GUJCOST)** for establishing **the Supercomputer facility** at the GSFC University
- MOU between GSFC University and **Gujarat Council on Science and Technology** (GUJCOST) for establishing **the Design Lab** at the GSFC University
- MOU between GSFC University and **IIT Gandhinagar**
- MOU between GSFC University & **AToS**
- MOU between GSFC University & **Parametric Technologies Pvt Ltd (PTC)**
- MOU between GSFC University & **National Association of Software and Service Companies (NASSCOM)**
- MOU between GSFC University & **Gujarat Biotechnology Research Centre for Industrial Internship.**
- MOU between GSFC University & **Setco Foundation for Scholarship program**
- Certificate of Strategic partnership between GSFC University and **Government of Gujarat**
- MOU between GSFC University & **NorthSouth Foundation**
- Tripartite MOU among GSFC University, **Deepak Foundation & SNDT Women's Foundation, Mumbai**
- MOU between GSFC University & **Gujarat Institute of Disaster Management (GIDM)**
- Tripartite MOU among GSFC, GSFC University and **Fertilizernagar All Religions Hall Charitable Trust**
- MOU between GSFC University & **Mahatma Gandhi Labour Institute, Ahmedabad**

CAREER OPPORTUNITIES FOR MECHANICAL ENGINEERS

Mechanical engineering graduates are sought by employers in almost all sectors of the engineering industry. These include the industries involved with aerospace, automotive, chemicals, construction, defense, consumer goods, marine, materials and metals, oil and gas, pharmaceuticals, power generation, rail, utilities, automation, R&D, etc. among several others.

STUDENT ASSOCIATIONS/Clubs

Students Managed Clubs (SMC) promotes the culture of active participatory learning and provides a firm platform to the students for sharing their innovative ideas. Various clubs include activities that promote social responsibility, civic engagement, industrial understanding, projects management, meticulous documentation and project execution with a purpose to train and develop human capital. The concept of initiating Students Managed Clubs (SMC) is an integral part of GSFC University to encourage active participation of students and thereby promote healthy competition. Some existing clubs of GSFC University are: GO Kart, Digital Manufacturing, Cultural Confluence club, Robotics, Event Management club, Multitasker's Club, Innovation and Trash Tech, Community Services, Arogyam, Environment, Photography, Art & Craft, University Band and African Documentation Clubs.

- **Aarogyam** Club
- **Adventure** Club
- **Biotechnology** Club
- **Business Management** Club
- **Community Services** Club
- **Cultural** Club
- **Civil Modelling** Club
- **CODE** Club
- **Debate & Elocution** Club
- **Environment** Club
- **Event Management** Club
- **Indian Heritage** Club
- **Mathematics** Club
- **Photography** Club
- **Sports** Club
- **3-D Printer** Club

ISHRAE GSFC University Student Chapter

GSFC University has a student chapter of Indian Society of Heat Ventilation & Air Conditioning Engineers (ISHRAE). By participating students get advantages of job opportunities in ISHRAE placement activities, funding for research projects related to the industry, professional networking, technical seminars, expert lectures and technical quiz competitions. 7 students won top 3 prizes in inter university quiz competitions at pan India level organized by reputed professional engineering group

PARAM SHAVAK COMPUTING FACILITIES

Gujarat Council on Science & Technology (GUJCOST), working under the aegis of the Department of Science & technology, Government of Gujarat have set up supercomputing facilities at GSFC University in to provide capacity building among students and faculties with advanced technologies to perform high-end computations for scientific, engineering and academic programs to address and catalyse the research using modelling, simulation and data analysis. The facility will also help in promoting research by integrating leading-edge emerging technologies at the grass root level.

The PARAM Shavak Supercomputing Facility for HPC and Deep Learning designed and developed by Centre for Development of Advance Computing (C-DAC), India. The Supercomputing facility established using C-DAC indigenous PARAM Shavak Supercomputing facility is equipped with latest Intel Processor and Accelerators technologies will bring in new innovation avenues in the field of Computational Science and Engineering through collaborative research and development in various engineering fields. This creation of Supercomputing infrastructure shall facilitate multi-disciplinary Engineering Research using high performance computing techniques, enabling technologies, Capacity & Capability Building, High End Computational Research and Innovation.

Remote Center OF IIT-BOMBAY

The institute has set up a remote centre of the Distance education Programme of IIT Bombay, The programme is now known as Centre for Distance Engineering Education Programme (CDEEP) of IIT-Bombay, as part of the National Mission on Education through ICT (MHRD, Govt. of India). Under this programme some of the courses of PG level, senior UG level and expert lectures being delivered at IIT Bombay are transmitted live via A-View network and received at the institute.

Under the programme, IIT Bombay conducts ISTE workshops during the vacation period in summer and winter. Teachers/students attend the workshops at a designated Remote Center (RC), close to their own college. Lectures are delivered by faculty from IIT Bombay, while tutorials and lab sessions are conducted locally in the same RC. The lecture transmission and live interaction take place in a virtual classroom environment, using the AVIEW technology on the internet.

Remote Center of IIRS/ISRO outreach network/EDUSAT NETWORK

ISRO has taken the initiative to launch a state-of-the-art Communication satellite to provide communication channels dedicated to education and training. Institute of technology has installed a Satellite Interactive Terminal (SIT) to participate in AICTE's Expert lectures and courses which are delivered through EDUSAT channel. The SIT terminal is interfaced with the Intranet so that the lectures received can be viewed on any PC across the campus giving students the video accessibility to such programmes.

Design/IDEA LAB

Gujarat Council on Science and Technology (GUJCOST), Govt. of Gujarat, working under the aegis of the Department of Science & Technology, Government of Gujarat has established as an effective and large scale science promotion and popularization platform in GSFC University. GUJCOST has been assigned to execute this scheme of establishment of Design Lab with appropriate concept and content in different educational institutions in the State.

A Design Lab is a platform for the young students with creative and innovative ideas. In the Design Lab, they can transform their idea into a tangible form. Students and academic researchers with innovative ideas, can get benefited with such Design Labs, where they can easily transform their creative ideas into deliverable form, at least on a lab scale or pilot project basis. Design Labs in Science, Engineering, and Technology disciplines work as a generator of intellectual properties like patents and industrial designs.

E-YANTRA ROBOTICS LAB IN CONSULTATION WITH IIT BOMBAY

e-Yantra Robotics laboratory in consultation with IIT Bombay is established for courses like Robotics, Mechatronics, and Advance Manufacturing Processes offered by the Mechanical Engineering program. Robotics course deals with the design, operation, automation, control, sensory feedback, etc. Also, robotics lab will be a great resource center for upcoming branches of B. Tech. & M. Tech courses like Robotics & Automation, computer engineering (i.e., IOT & Automation and Big Data & Artificial Intelligence).

The main benefit of engaging with robotics lab is to empower teachers and students and to create a culture of innovation and entrepreneurship. Science and engineering students will be the prime beneficiary to explore interdisciplinary skills and to prepare them for the skills that are demanded by the industry. It will also provide an opportunity to our students to develop skills which may help them in various startups related to robotics and automations. This lab will provide innovation hubs for incubating exciting projects.

Robotics is the future, and it has many applications in different industries. The robotics lab will not only provide encouragement to the students to come up with new ideas, but they will also be exposed to the current technologies which are being adopted and used in today's leading industries making them industry ready and increasing their employability.

GUIITAR COUNCIL

- GSFC University Innovation, Incubation, Technology and Applied Research (GUIITAR) Council is established as a cross-disciplinary training platform for students to innovate, incubate and work in applied research activities at GSFCU.
- The research focus at GUIITAR Council is primarily on applied work with industry relevance. GUIITAR is mandated to engage in collaborative research with industry partners and public institutions on various issues of direct interest to the business community and to the society at large.
- GUIITAR Council is a single point of access for industry and/or community partners who wish to engage in economically, socially and educationally relevant collaborative, applied research projects with our faculties and students.
- Two Broad Agendas addressed through different sectors of Engineering & Technology, Sciences and Management, under the umbrella of GUIITAR Council:

1. Applied Research Projects funded by Industries
2. Nurturing Potential Start-Ups by incubating to GSFC University's Entrepreneurship Development Centre (EDC).