

STRATEGIC PLAN

(2020-2025)



Department of Mechanical Engineering

J.C. BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY,

YMCA, FARIDABAD

(Formerly YMCA University of Science and Technology)

NAAC 'A' Grade accredited State University

Sector-06, Delhi Mathura Road, Faridabad -121006 (Haryana)

ABOUT THE DEPARTMENT

The department of Mechanical Engineering has been in existence since inception of institute in 1969. It offered Post-Diploma courses with specialization in three streams viz. i) Machine Tools; ii) Refrigeration and Air-conditioning; iii) Fabrication, Welding and Sheet Metal Technology.

The labs & workshops have been setup with the assistance of German expertise. In 1996, State Govt. of Haryana took complete control of the Institute and upgraded it to University status in Dec. 2009.

The Department of Mechanical Engineering offers courses at UG and PG level. At UG level, B. Tech. course in Mechanical Engineering, started in 1997 with an intake of 60 students and it has been increased 120 students at present. M. Tech. programme in Mechanical Engineering with specialization in Manufacturing Technology and Automation was started from the academic year 2003-04 and has an intake of 18 students. The University had started Ph.D. Course since 2010 and 57 students have registered themselves for the Ph.D. programme in the department.

The Department of Mechanical Engineering has a distinguished record in both teaching and research. The department was shifted to the new building in January 2009 with modern facilities and a dedicated technical and office staff to support the academic programs and research.

The department is actively engaged in research work in the broad area of Design of Mechanical Equipment, Design & Manufacturing, Thermal, Energy Conservation, TQM, Product and Service Quality, Computer Integrated Manufacturing, Manufacturing, Industrial Engineering, Computer Aided Engineering, Just in Time, etc.

The departmental facilities include 16 labs, 3 workshops (Machine Tools, Refrigeration & Air conditioning, Fabrication & Sheet Metal Technology), 8 lecture halls, 1 conference room and 1 seminar hall with Wi-Fi facilities. Department has two centres of excellence in collaboration

with Danfoss Industries (P) Ltd. (for Climate and Energy) and Daikin Air-Conditioning (P) Ltd (for Air-Conditioning).

The department has highly qualified and experienced faculty including 11 professors, 02 Associate professors and 13 Assistant Professors. 23 of the faculty members are Ph.D. holders with average experience of 15 years approximately.

During last 5 years, faculty members have published more than 500 papers in various National and International Journals and Conferences of repute in India and abroad.

The Mechanical Engineering Department is also highly active in co-curricular and technical activities. Two of its club namely MechNext Club and SAE India YMCA Collegiate Club are actively engaged in practising latest developments for innovative design of automobile vehicles and has won many prizes at National level.

VISION

To be a centre of excellence by producing high calibre, competent and self-reliant mechanical engineers, who possess scientific temperament and would engage in activities relevant to industries with ethical values and flair to research.

MISSION

- To provide efficient engineers for global requirements by imparting quality education.
- To explore, create and develop innovations in various aspects of engineering through industries and institutions.
- To emphasize on practical skills and socially relevant technology.

STRATEGIC GOALS

- To build a team of academicians, to attain excellence, to offer academic programmes in engineering at undergraduate, postgraduate and doctoral levels.
- To motivate faculty members for higher education.
- Introduction of newer and innovative PG & Ph. D. programmes.
- To interact more with Industries & Engineering Institutes.
- To develop the Institute as knowledge industry.
- To improve existing labs and develop new labs.
- To inculcate moral values in students.
- To motivate the faculty and students for Research/ Quality Publication.
- To keep faculty members informed about the latest developments in research, technology and teaching methods.
- To interact with neighbouring industries and institutions to exchange technological developments.

PROGRAM EDUCATIONAL OUTCOMES (PEOs) & PROGRAM OUTCOMES (POs)

B. Tech. (Mechanical Engineering)

Program Educational Outcomes (PEOs)

PEO-1

To train students with practical skills and experimental practices related to core and applied areas of Mechanical Engineering to expand their knowledge horizon beyond books.

PEO-2

To enable students to design, develop and maintain mechanical equipments which are useful for the society.

PEO-3

To improve team building, team working and leadership skills of the students with high regard for ethical values and social responsibilities.

PEO- 4

To enable students to communicate effectively and demonstrate the knowledge of project management and independent research.

Program Outcomes (POs)

Engineering Graduates will be able to:

- 1) **Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and mechanical engineering to the solution of engineering problems.
- 2) **Problem Analysis:** Identify, formulate, review literature and analyze mechanical engineering problems to design, conduct experiments, analyze data and interpret data.
- 3) **Design /Development of Solutions:** Design solution for mechanical engineering problems and design system component of processes that meet the desired needs with appropriate consideration for the public health and safety, and the cultural, societal and the environmental considerations.

- 4) **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in mechanical engineering.
- 5) **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to mechanical engineering activities with an understanding of the limitations.
- 6) **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to mechanical engineering practice.
- 7) **Environment and Sustainability:** Understand the impact of the mechanical engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
- 8) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the mechanical engineering practice.
- 9) **Individual and Team Work:** Function affectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings in mechanical engineering.
- 10) **Communication:** Communicate effectively on complex engineering activities with the engineering committee and with society at large, such as, being able to comprehend and write affective reports and design documentation, make effective presentations in mechanical engineering.
- 11) **Project Management and Finance:** Demonstrate knowledge & understanding of the mechanical engineering principles and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments in mechanical engineering.
- 12) **Life- Long Learning:** Recognize the need for, and the preparation and ability to engage in independent research and lifelong learning in the broadest context of technological changes mechanical engineering.

□ **M. Tech. (Manufacturing & Automation)**

Program Educational Outcomes (PEOs)

PEO-1:

Post Graduates will have fundamental technical knowledge and develop analytical skills required for mechanical engineering (manufacturing technology and automation).

PEO-2:

Post Graduates to focus on practical skills and capable of using software and developing program related to core and applied areas of their discipline to expand their knowledge horizon beyond books and to equip them with experimental and industrial practices.

PEO-3:

Post Graduates will have improved team building, team working and leadership skills with high regard for ethical values and social responsibilities.

PEO-4:

Post Graduates will create and develop innovations in various aspects of mechanical engineering.

Program Outcomes (POs)

M. Tech. Engineering students will have following capabilities:

- 1) Ability to independently carry out research /investigation and development work to solve practical problems of Manufacturing Technology and Automation Engineering.
- 2) Ability to write and present a substantial technical report/document
- 3) Students should be able to demonstrate a degree of mastery in the area of Manufacturing Technology and Automation Engineering. The mastery should be at a level higher than the requirements in the bachelor program of Mechanical Engineering
- 4) Ability to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data for the solution of complex problems of manufacturing industries/institutions
- 5) Ability to develop and apply computer-based software and hardware tools for the

analysis of problems related to mechanical design, manufacturing and automation fields.

- 6) Ability to apply the acquired knowledge to assess societal, safety, ethical issues and subsequently design / develop mechanical equipments and systems.

SWOC ANALYSIS

Strengths

- NBA accredited B. Tech. and M. Tech. programmes.
- A synergic team of young and experienced faculty who are committed to intellectual pursuits and are professionally enthusiastic who enjoy working in interdisciplinary teams.
- High Cadre Ratio.
- Department has 23 faculty members having Ph.D. degree.
- Faculty members are members of various statutory Board/ Bodies.
- Excellent faculty retention.
- Innovative, diligent and inquisitive students.
- Robust and transparent evaluation system.
- Use of ICT in teaching-learning process.
- 360⁰ Feedback mechanism in place.
- Remedial mentoring system in place.
- Alumni acting as leading entrepreneurs in the country.
- Well- established workshops.

Weaknesses

- Research projects from industries.
- Full-time research associates/ scholars with scholarships.
- Technical manpower in labs.

Opportunities

- Enhanced opportunities for inter- disciplinary projects as per the National Educational Policy (NBE) 2020.
- Collaboration with top international universities/ institutions as per the policies of University International Affairs Cell.

Challenges

- To explore avenues for industrial projects.
- Less number of students from other states.
- Lack of inter- disciplinary projects.
- Adaptation to upcoming newer technologies.

STRATEGY PLAN

2020- 2021

- AICTE approved STC on Advances in Manufacturing Technology: CNC & Robotics, in August, 2020.
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- To procure state of the art equipment like 3D- printer.
- Upgradation of existing labs.

2021- 2022

- Start of B. Tech. (Robotics)
- Conduct an International Conference.
- Conduct STC on 3D- Printing
- Conduct FDPs in various fields of Mechanical Engineering
- Upgradation of existing labs.
- Implementation of new syllabus for B. Tech. program.

2022- 2023

- Increase the intake of M. Tech. (Manufacturing & Automation) from 18 to 24.
- Conduct an International Conference.
- Conduct FDPs in various fields of Mechanical Engineering
- Upgradation of existing labs.
- Upgradation of Research Lab.

2023- 2024

- Start M. Tech. (Thermal Engineering).
- Conduct an International Conference.
- Conduct STC on 3D- Printing
- Conduct FDPs in various fields of Mechanical Engineering
- Upgradation of existing labs.

2024- 2025

- Increase the intake of M. Tech. (Thermal Engineering) from 18 to 24.
- Conduct an International Conference.
- Conduct FDPs in various fields of Mechanical Engineering
- Upgradation of existing labs.
- Implementation of new syllabus for B. Tech. program.

