(053-CMT-01-03) MEDICAL ROBOTICS AND ARTIFICIAL INTELLIGENCE

Significance of the Program

Medical robotics and artificial intelligence (AI) have revolutionized the field of healthcare, bringing cutting-edge technology to the forefront of patient care. Medical robotics involves the use of robotic systems to assist in various medical procedures, ranging from surgeries to rehabilitation. The AI in healthcare makes use of the advanced algorithms and machine learning to analyze complex medical data, diagnose conditions. Its aim is to enhance the precision, efficiency, and outcomes of medical interventions, which leads to the betterment of the patient's well-being.

Career Options

Pursuing a professional course in Medical Robotics and Artificial Intelligence, students can explore the following opportunities.

- **Medical Robotics Engineer**: Design and develop robotic systems used in surgery, diagnostics, or rehabilitation.
- **AI Specialist in Healthcare**: Work on developing and implementing AI algorithms for medical applications.
- **Data Scientist in Healthcare**: Analyze and interpret large datasets to extract meaningful insights.
- **Medical Imaging Specialist**: Focus on the development and improvement of medical imaging technologies using AI.
- **Biomedical Engineer**: Combine knowledge of engineering principles with medical and biological sciences to design and maintain medical equipment, including robotic systems and AI applications.

Program Objectives

1. Provide students with a foundational understanding of the principles and concepts underlying medical robotics and artificial intelligence in healthcare.
2. Explore the applications of robotics in medicine, including surgical robotics, rehabilitation robotics, and tele-presence systems.
3. Examine the role of artificial intelligence in healthcare, focusing on diagnostic applications, decision support systems, and personalized medicine.

4. Illustrate how medical robotics and AI can be integrated to enhance patient care surgical procedures.

Outcomes of the Program

- Enables the student to understand robotic-assisted surgeries, including system components, applications, and the impact on surgical outcomes.
- Enables the student to make use of AI in medical diagnostics, including image analysis, pattern recognition, and predictive modelling for disease detection.
- Enables the student to design and implement interfaces for effective communication between healthcare professionals and robotic systems.
- Enables the student to Explore virtual reality and simulation technologies in medical training, allowing students to understand how these technologies contribute to skill development in surgery.

Major Course Outline

- Robotic Systems Engineering
- Artificial Intelligence for Surgery and Intervention
- Medical Robotics and Devices
- Surgical Data Science
- Machine Learning in Medical Imaging
- Robotic Control Theory and Systems
- Robotic Sensing, Manipulation and Interaction
- Robot Vision and Navigation