

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
SYLLABUS FOR BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING
(Effective from academic session 2018-19)

Subject Code: H	Category: Professional Elective Courses
Subject Name: Robotics	Semester: Sixth
L-T-P: 3-0-0	Credit: 3
Pre-Requisites: Manufacturing Technology	

Course Objective:

To impart knowledge about the engineering aspects of Robots and their application

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	Introduction: Basic concepts- Robot anatomy- Manipulators- kinematics: Forward and inverse kinematics- Precision movement, robot specifications and Work volume, Types of Robot drives- Basic robot motions- Point to point control, continuous path contour.	8
2	End Effectors: End effectors- classification- mechanical, magnetic, vacuum and adhesive gripper- gripper force analysis and design. Robot control- Unit control system concept- servo and non-servo control of robot joints, adaptive and optimal control.	7
3	Sensors: Sensor devices, Types of sensors- contact, position and displacement sensors, Force and torque sensors- Proximity and range sensors- acoustic sensors- Robot vision systems- Sensing and digitizing- Image processing and analysis.	6
4	Robot Programming: Robot language classification- programming methods- off and on line programming- Lead through method- Teach pendent method- VAL systems and language, simple program.	8
5	Industrial Application: Application of robots- Material handling- Machine loading and unloading, Assembly, Inspection, Welding, Spray painting, Mobile robot, Microbots- Recent developments in robotics- safety consideration.	7

Course Outcome:

1. To familiarize the Basics of robots Control system.
2. To familiarize the end effectors, Sensor technology and Industrial application of robot.

Learning Resources:

1. S.R. Deb, Robotics technology and flexible automation, McGraw Hill publishing company limited, New Delhi, 1994.

2. M.P. Groover. Industrial Robotics Technology Programming and Applications, McGraw Hill Book Co, Singapore, 1987.
3. S.K. Saha, Introduction to Robotics, McGraw-Hill Publication, 2014.
4. Y. Koren, Robotics for Engineers, McGraw Hill, New York, 1985.
5. P.G. Ranky and C.Y. Ho, Robots Modelling Control and Applications with Software, Springer Verlag, 1985.
6. J.J. Craig, Introduction to Robotics, Addison-Wesley, 2009.
7. R.J. Schilling, Fundamentals of Robotics Analysis and Control, Prentice Hall of India, 1996.
8. T. Yoshikawa, Foundations of Robotics Analysis and Control, Prentice Hall of India, 2010.
9. K.S. Fu, R.C. Gonzales and C.S.G. Lee, Robotics: Control, Sensing, Vision and Intelligence, McGraw Hill, 1997.
10. W. Stadler, Analytical Robotics and Mechatronics, McGraw Hill Book Co., 1995.