

## IAGE - 313

### Industrial Robotics

(02 credits – 50 marks)

#### Course Outcomes:

On completion of the Course, students should be able to

1	Recall the fundamental aspects of automation and robotics
2	Discuss brief history of robotics, robotics market and future prospectus
3	Use the robots in various manufacturing processes
4	Explain the safety training and maintenance and quality improvement aspects; social issues and future of robotics
5	Reframe the robot programming
6	Develop simple programs to define pre-coordinated trajectory of robots, for pick and place operation with a six axis industrial robot, for stacking operation with a six axis industrial robot

#### **Course Contents:**

##### **Module- I: Fundamentals of Robotics**

**(04 Hrs)**

Introduction, Automation and Robotics, A brief History of Robotics, Robotics Market and the Future Prospectus

##### **Module- II: Robot Programming**

**(07 Hrs)**

Methods of Robot Programming, Lead through Programming Methods, Robot Program as path in space, Motion Interpolation, WAIT Signal and Delay Commands, Capabilities and Limitations of Lead through Methods; Robot Languages: Textual Robotic Languages, Generations of Robotic Programming Languages, Robot Language Structure, Motion Commands, Program Control and Subroutines, Monitor Mode Commands

##### **Module- III: Robot Applications in Manufacturing**

**(07 Hrs)**

Material Transfer and Machine Loading/Unloading, Processing Operation: spot welding, arc welding, spray coating, other processing operation using Robotics, Assembly and Inspection: Assembly and Robotic Assembly Operation, Inspection Automation

**Module- IV: Implementation Principles and Issues of Robotics**

**(06 Hrs)**

Implementation of Robotics; Safety Training and Maintenance and Quality Improvement; Social Issues and Future of Robotics

**Module- V:** Tutorials, assignments and presentation based on Module I to IV

**Reference:**

1. Industrial Robotics-Technology Programming and Applications by Mikell P Groover, Mitchell Weiss, Nagel and Odrey ISBN-13:978-0-07-026509-7 ISBN- 10: 0-07-026509-7
2. Richard D. Klafter, Thomas .A, Chri Elewski, Michael Negin, Robotics Engineering an Integrated Approach, Phi Learning., 2009.
3. P.A. Janaki Raman, Robotics and Image Processing An Introduction, Tata Mc Graw Hill Publishing company Ltd., 1995.
4. Francis N-Nagy Andras Siegler, Engineering foundation of Robotics, Prentice Hall Inc., 1987.
5. Bernard Hodges, Industrial Robotics, Second Edition, Jaico Publishing house, 1993.
6. Tsuneo Yohikwa, Foundations of Robotics Analysis and Control, MIT Press. 2003.
7. John J. Craig, Introduction to Robotics Mechanics and Control, Third Edition, Pearson, 2008.
8. Bijay K. Ghosh, Ning Xi, T.J. Tarn, Control in Robotics and Automation Sensor – Based integration, Academic Press, 1999
9. Deb. S. R. “Robotics technology and flexible automation”, Tata McGraw Hill publishing company limited, 1994