II SEMESTER

INDUSTRIAL ROBOTICS

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Module – 1


Module – 2

Module – 3

COMPUTER CONSIDERATIONS FOR ROBOTIC SYSTEMS: Computer architecture for robots, hardware, Computational elements in robotic applications – Robot programming – sample programs path planning – Robot’s computer system.

Module – 4

Module – 5

APPLICATIONS OF ROBOTS: Capabilities of Robots – Robotics Applications – Obstacle avoidance – Robotics in India – The future of Robotics
TEXT BOOKS:

REFERENCE BOOKS:

NON-TRADITIONAL MACHINING PROCESSES

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Module – 1
Mechanical Process: Ultrasonic Machining-Definition-Mechanism of metal elements of the process- Tool feed mechanism. Theories of mechanics of causing effect of parameter applications.
Abrasive Jet Machining: Principles - parameters of the process applications-advantages and advantages.

Module – 2
Plasma arc Machining: Introduction-Plasma-Generation of Plasma and equipment Mechanism of metals removal, PAN parameters-process characteristics - type of torches applications.

Module – 3
Chemical Machining: Introduction-fundamental principle types of chemical machining Maskants-Etchenes- Advantages and disadvantages-applications.

Module – 4
Laser Beam Machining (LBM): Introduction-principle of generation of lasers Equipment and Machining procedure-Types of Lasers-Process characteristics-advantages and limitations-applications

Ion Beam Machining: Introduction-Mechanism of metal removal and associated equipment-process characteristics applications

Module – 5


REFERENCE BOOKS:

1. New technology Institution of Engineers - Bhattacharya - India

ADVANCED JOINING PROCESSES

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Module – 1

Distortion- methods to avoid distortion. Stresses in Joint Design.


Module – 2

Welding and cladding of dissimilar materials, overlaying and surfacing.
Advanced soldering and brazing processes -different types.Welding of plastics.

Module – 3

Inspection of Welds: Destructive techniques like Tensile, Bend, Nick break, Impact & Hardness. Non-Destructive techniques like 'X' rays, Ultrasonic, Magnetic particle, Dye Penetrant, Gamma ray inspection.
Welding Symbols- Need for, Representing the welds, Basic weld symbols, Location of Weld, Supplementary symbols, Dimensions of welds, Examples
Module – 4

**Quality Control in Welding** - Introduction. Quality assurance v/s Quality control, Weld quality, Discontinuities in welds, their causes and remedies and Quality conflicts.

Module – 5

**REFERENCE BOOKS:**
4. *Welding Technology* - O.P. Khanna
5. *Welding for Engineers* - Udin, Funk &Wulf

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**AGILE MANUFACTURING**

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Module – 1


Module – 2

**Four Core Concepts**: Strategy driven approach - integrating organization, people technology interdisciplinary design methodology.

Module – 3

**Agile Manufacturing and Change Management**: The change implications. Post failures in advanced manufacturing, changes on the way, traditional management accounting, paradigm, investment appraisal, product costing - performance, measurement and control systems, Traditional organization, control technological and design paradigms traditional problems in workplace-organizational issues - role of technology.

Module – 4

**Agile Manufacturing Enterprise Design**: Agile manufacturing - enterprise design. system concepts as the basic manufacturing theory - joint technical & organizational design and a model for the design of agile manufacturing enterprise, enterprise design process insights into design processes, what is interdisciplinary design, Main issues - simple design example.

Module – 5

**Skill & Knowledge Enhancing Technologies for Agile Manufacturing**: Skill and Knowledge

REFERENCE BOOKS:

NON-DESTRUCTIVE TESTING

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Module – 1
Introduction to ND Testing: Selection of ND methods, visual inspection, leak testing, Liquid penetration inspection, its advantages and limitation.

Module – 2

Magnetic Particle Inspection: Methods of generating magnetic field, types of magnetic particles and suspension liquids steps in inspection – application and limitations.

Eddy Current Inspection: principles, operation variables, procedure, inspection coils, and detectable discounts by the method.

Module – 3

Ultrasonic inspection: Basic equipment characteristics of ultrasonic waves, variables inspection, inspection methods pulse echo A,B,C scans transmission, resonance techniques, transducer elements couplets, search units, contact types and immersion types inspection standards-standard reference blocks.

Module – 4

Radiography Inspection: principles, radiation source X-rays and gamma rays, X-ray-tube, radiographic films, neutron radiography, Thermal inspection principles, equipment inspection methods applications.

Module – 5

Optical Holography: Basics of Holography, recording and reconstruction - Acoustical Holography: systems and techniques applications. Indian standards for NDT.

Microwave Inspection: Microwave holography, applications and limitations.
REFERENCE BOOKS:


**SURFACE TREATMENT & FINISHING**

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**Module – 1**

**Module – 2**
**Vacuum coating**, FVD & CVD metal spraying - Methods, surface preparation, mechanical Properties of sprayed metals, plasma coating.

**Module – 3**
**Plastic coating of metal** - PVC coating Spherodising process details, phosphate coating - mechanism of formation.
**Testing of surface coating** - methods.

**Module – 4**
**Heat treatment methods for gears, spindles, cutting tools.**

**Module – 5**
**Advanced coating technologies**: Hard facing, electro deposition technique, nanocoatings, coating characterization

**REFERENCE BOOKS:**

5. **Metals Hand Book** – ASM.
SIMULATION AND MODELING OF MANUFACTURING SYSTEMS.

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Module – 1

**Principle of Computer Modelling and Simulation:** Monte Carlo simulation. Nature of computer-modeling and simulation. Limitations of simulation, areas of applications.

**System and Environment:** Components of a system -discrete and continuous systems, Models of a system -a variety of modeling approaches.

Module – 2

**Discrete Event Simulation:** Concepts in discrete event simulation, manual simulation using event scheduling, single channel queue, too server queue, simulation of inventory problem.

**Statistical Models in Simulation:** Discrete distributions, continuous distributions.

Module – 3

**Random Number Generation:** Techniques for generating random numbers- Mid square method -the mod product method -Constant multiplier technique -Additive congruential method -Linear congruential method -Tests for random numbers -The Kolmogorov-Smirnov test -the Chi-square test, IvicaCmkovic, Ulfskluna and AnnitaborsenDohlgvist Publisher Artechhouse.

Module – 4

**Random Variable Generation:** Inversion transforms technique-exponential distribution, uniform distribution, weibul distribution, continuous distribution, generating approximate normal variates-Erlang distribution.

**Empirical Discrete Distribution:** Discrete uniform -distribution Poisson distribution -geometric distribution -acceptance -rejection technique for Poisson distribution gamma distribution.

Module – 5

**Design and Evaluation of Simulation Experiments:** variance reduction techniques -antithetic variables, variables-verification and validation of simulation models.

**Simulation Software:** Selection of simulation software, simulation packages.

**TEXT BOOKS:**

**REFERENCE BOOKS:**
PRODUCT DATA MANAGEMENT

Subject Code : **16 MPY 254**  
IA Marks : 20  
No. of Lecture Hours/Week : 03  
ExamHours : 03  
Total No. of Lecture Hours : 40  
Exam Marks : 80

Module – 1
**Introduction**: Introduction to PDM-present market constraints need for collaboration- Internet and developments in server-client computing.

Module – 2
**Components of PDM**: Components of a typical PDM set-up hardware and software- document management creationand viewing of documents -creating parts-version control of parts and documents –case studies.

Module – 3

Module – 4
**Configuration Management**: Base lines-product structure configuration management -case studies.  
**Change Management**: Change issue -change request-change investigation- change proposal-change activity-case studies.

Module – 5
**Generic Products and Variants**: Products configuration comparison between sales configuration mild products generic-generic product modeling in configuration modeler-use of order generator for variant creation -registering of variants in product register-case studies.

**REFERENCE BOOKS:**