PR 603 FLEXIBLE TOOLING AND AUTOMATED INSPECTION

Lectures	Tutorial	Practical's	Total credits
2	1	2	4

Course Objective:

Develop flexible tooling for Manufacturing and automated inspection

Course Outcomes:

1. State of Art in Tooling in Manufacturing and Inspection
2. Design and Develop tooling for Flexible Manufacturing
3. Design and Develop Automated Inspection Systems

Contact Classes (Theory and Tutorials)

Lesson 1 Introduction -Principles of Tooling in Manufacturing

Lesson 2 Tooling for Machining and Economics of Tooling

Lesson 3 Pre -Design Product and Process Analysis for Tooling -Standard Tooling Practices

Lesson 4 Automated Tooling for Machining-Tool Changers-Tool Presets

Lesson 5 Flexible Tooling - Modular Fixtures Design and Construction

Lesson 6 Location Clamping Guiding/Setting Jigs and Fixtures

Lesson 7 Tooling for Forming- Evolution of Die set for blanking, bending and drawing

Lesson 8 Forging, and Extrusion Processes-Special Forming Processes

Lesson 9 Tooling for casting processes –Mechanization

Lesson 10 Flexible tooling in Non Traditional Manufacturing

Lesson 11 Tooling for Micro Manufacturing

Lesson 12 Tooling for Physical and Mechanical joining Processes

Lesson 13 Measurement Systems- Principles of Gauging - New concepts

Lesson 14 Tooling for CMM

Lesson 15 Tool handling Robots

Lesson 16 Machine vision and Robots Applications

Lesson 17 Smart Inspection Systems - Techniques and Applications of Intelligent Vision

Lesson 18 AVI Stages process illumination, image enhancement, segmentation and feature extraction,

Lesson 19 Robots in Material Processing, Material handling, Automated Inspection

Lesson 20 Case studies on AVI systems and Modern Tooling Practices

Delivery of Contents:

Chalk and Talk, PPTs, Video presentations, Design tutorials and Practical's

Practicals:

1. Planning of Tool holding and work holding in traditional Machining (Turning Drilling and Milling) and non-traditional Machining (ECM and EDM)
2. To study and plan the scheme for tooling in a machining centre and Turning centres
3. To study and plan the scheme for tooling in Coordinate Measuring Machine and NC Micromachining
4. Planning tooling using hydraulic, pneumatic and electro pneumatic Mechatronics systems and AS/RS
5. Design of jigs, Fixtures and Gauges
6. Design of Tooling for Forming
7. Robots in handling and inspection

Evaluation Scheme:

Term Tests 30 Tutorials and Practical Assignments 20

Final Examination 50 Marks (Design of Tooling)

REFERENCES

1. Hoffman, G., Fundamentals of Tool Design Society of Manufacturing Engineering
2. Handbook of fixture design by FW Wilson, McGraw Hill ASTME
3. Jigs and fixtures by PH Joshi, McGraw Hill
4. Design of jigs, fixtures and press tools K Venkataraman, Wiley Publications
5. P.C.Sharma, "A Text Book of Production Engineering", S.Chand & Company Ltd.,
6. Parsons, W.J,, "Production tooling equipment", Macmillan& Co. Ltd., 1966.
7. Donaldson, C., "Tool Design", Tata MeGraw Hill Pub.Co., m Ed., 1986.
8. Kempster, "Jigs and fixture design", The English Language Book Society, 1978.
9. Laboratory Manuals
10. Web Based Lecture Notes and Study Materials

Faculty PAC Chairman HOD

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