UNIT - 8

Rapid Manufacturing Process Optimization: factors influencing accuracy. Data preparation errors, Part building errors, Error in finishing, influence of build orientation.

08 Hours

TEXT BOOKS:

1. **Stereo Lithography and other RP & M Technologies,** Paul F. Jacobs: SME, NY 1996.
2. **Rapid Manufacturing,** Flham D.T & Dinjoy S.S Verlog London 2001.

REFERENCE BOOKS:

1. **Rapid Prototyping,** Terry Wohlers Wohler's Report 2000" Wohler's Association 2000.
2. **Rapid Prototyping Materials,** Gurumurthi, IISc Bangalore.
3. **Rapid Automated,** Lament wood. Indus press New York

FOUNDRY TECHNOLOGY

Sub Code	**: 10ME 838**	**IA Marks**	**: 25**
Hrs/week	**: 04**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 52**	**Exam Marks**	**: 100**

PART - A

UNIT - 1

Foundry Metallurgy: Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.

06 Hours

UNIT - 2

Casting Design: Introduction to casting design, redesign considerations, design for minimum casting stresses, design for directional solidification, design for metal flow, safety factors, design for low pattern cost and model making as an aid in design.

06 Hours

UNIT - 3

Solidification Of Castings: Crystallization and development of cast structure - nucleation, growth and dendritic growth. Structure of castings - significance

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and practical control of cast structure, grain shape and orientation, grain size, refinement and modification of cast structure. Concept of progressive and directional solidification, solidification time and derivation of Chvorinov's equation, influence on mold characteristics and cast metal.

UNIT - 4 **07 Hours**

Risering And Gating: Need for risering, general considerations of risering, riser shapes, riser size, and location. Requirements of a riser. Sand, insulating, and exothermic materials used for risers. Riser feeding distance and theory of risering. Internal chills, external chills, use of mould materials of different chill capacities, padding for directional solidification. Open type and blind risers. Riser treatment using exothermic and insulating compounds. Gating system – theoretical consideration of gating, laws of fluid flow, turbulence in gating system, use of ceramic foam filters in gating, need for tapered sprue, gating ratio, simple problems.

07 Hours

PART - B

UNIT - 5

Special Moulding Techniques: Principles, materials used, process details and application of no-bake sand systems, vacuum moulding, flaskless moulding, and high pressure moulding.

CUPOLA MELTING: Developments in cupola melting – hot blast cupola, water cooled cupola, balanced blast cupola, cokeless cupola, cupola charge calculations.

UNIT - 6 **07 Hours**

Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical steels, grey cast iron, malleable iron, and spheroidal graphite cast iron castings.

UNIT - 7 **07 Hours**

Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminum, copper, and magnesium based alloy castings.

UNIT - 8 **06 Hours**

Modernization And Mechanization Of Foundry: Need for modernization, and mechanization, moulding and core making, melting, pouring, shake out equipment and fettling, dust and fume control, material handling equipments for sand moulds and cores, molten metal and castings, reclamation of sands. Pollution control – norms, and agencies.

06 Hours

TEXT BOOKS:

1. **Principles of metal casting,** Heine Loper & Rosenthal TMH - 2005

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2. **Principle of Foundry Technology**, P. L. Jain, 5th Ed., TMH – 2006.

REFERENCE BOOKS:

1. **Castings,** John Campbell, Second edition, Elseivier
2. **Foundry Technology,** P. N. Rao
3. **Manufacturing Process,** I, Dr. K. Radha Krishna 5th Edn. Sapna Book House, Bangalore

ELECTIVE-II (GROUP - E)

MACHINE TOOL DESIGN

Sub Code	**: 10ME 841**	**IA Marks**	**: 25**
Hrs/week	**: 04**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 52**	**Exam Marks**	**: 100**

PART - A

UNIT - 1

Principles Of Machine Tool Design: General requirements of machine tool design - design process machine tool layout general requirements of machine tool design – design process machine tool layout

05 Hours

UNIT - 2

Machine Tool Drives And Mechanisms: Working and auxiliary motion. Drives- Electric drives, Hydraulic transmission, Kinmatic structure, Regulation of speed and feeds, stepped regulation, standardization of speed and feed, stepless regulation of speeds and feeds.

07 Hours

UNIT - 3

Cutting Force Analysis And Power Requirement: In Turning, Milling, Drilling, Shaping and Broaching operation with simple problems. General requirements of machine tools - Centre lathe, Milling machine.

07 Hours

UNIT - 4

Design Of Machine Tool Structures: Functions-Requirements-Design criteria Material used – static and dynamic stiffness – Profile and basic design procedure for machine tool structures. Design of beds, columns, housing, bases, tables, cross-rails, arms saddle, carriages.

07 Hours

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