

32042 SPECIAL MACHINES

DETAILED SYLLABUS

UNIT- I MANUFACTURING OF PLASTIC COMPONENTS

Plastic Components: Types of plastics - Engineering plastics – thermosets – composite - structural foam, elastomers - polymer alloys and liquid crystal polymers. Factors Influencing the Selection Of Plastics - Mechanical properties – degradation - wear resistance - frictional properties - special properties –processing – cost.

Processing of Plastics: Extrusion-general features of single screw extrusion -twin screw extruders. Injection moulding types: Plunger type - Reciprocating screw injection - details of injection mould - structural foam injection mould - sandwich moulding - gas injection moulding - injection moulding of thermosetting materials - calendaring and rotational moulding. Design consideration for plastic components.

Composite manufacturing: Introduction – characteristics of composite manufacturing - constituents – Glass fibers manufacturing process – hand laminating process – autoclave processing – filament winding – pultrusion process – liquid composite process – working principles by schematic diagram only – advantages – disadvantages.

UNIT- II RECIPROCATING MACHINES

Planer: Introduction - description of double housing planer – specifications - principles of operation – drives - quick return mechanism - feed mechanism - work holding devices and special fixtures - types of tools - operations.

Shaper: Introduction – specifications – principles of operations standard shaper – quick return mechanism - crank and slotted link – hydraulic shaper - feed mechanism - work holding devices – fixture – operations.

Spotter: Introduction – specifications - method of operation - Whitworth quick return mechanism - feed mechanism - work holding devices - types of tools.

Broaching: Types of broaching machine - horizontal, vertical and continuous broaching - principles of operation - types of broaches – classification - broach tool nomenclature - broaching operations.

UNIT- III MILLING MACHINES AND GEAR GENERATING PROCESSES

Milling Machines: Types - column and knee type – plain - universal milling machine - vertical milling machine - principles of operation - specification of milling machines - work holding devices - tool holding devices - arbor - stub arbor - spring collet – adapter. Milling cutters: cylindrical milling cutter - slitting cutter - side milling cutter - angle milling cutter - Tslot milling cutter - woodruff milling cutter - fly cutter - nomenclature of cylindrical milling cutter. Milling operations: straddle milling - gang milling - vertical milling attachment. Indexing plate – differential indexing - simple indexing – compound indexing – simple problems.

Generating Process: gear shaper - gear hobbling - principle of operation only. Gear finishing processes: burnishing – shaving - grinding and lapping - gear materials.

UNIT- IV ABRASIVE PROCESS AND NON- CONVENTIONAL MACHINING PROCESSES

Abrasive Process: Types and classification – specifications - rough grinding – pedestal grinders - portable grinders - belt grinders - precision grinding - cylindrical grinder - centerless grinders – surface grinder - tool and cutter grinder - planetary grinders - principles of operations - grinding wheels – abrasives - natural and artificial diamond wheels - types of bonds - grit, grade and structure of wheels - wheel shapes and sizes - standard marking systems of grinding wheels - selection of grinding wheel - mounting of grinding wheels - Dressing and Truing of wheels - Balancing of grinding wheels.

Non-Conventional Machining Processes: Construction, working and applications of Ultrasonic machining - chemical machining - electro chemical grinding - electrical discharge machining - plasma arc machining - LASER machining - Advantages – Disadvantages.

UNIT- V CNC MACHINE AND ITS COMPONENTS

CNC Machines: Numerical control – definition – working principle of a CNC system – Features of CNC machines - advantage of CNC machines – difference between NC and CNC – Construction and working principle of turning centre – Construction and working principle of machining centre – machine axes conventions turning centre and machining centre – Coordinate measuring machine – construction and working principle.

Components of CNC machine: Slide ways – requirement – types – friction slide ways and antifriction slide ways - linear motion bearings – recirculation ball screw – ATC – tool magazine – feedback devices – linear and rotary transducers – Encoders - in process probing - tool material – tool inserts.

Diploma, Anna University-UG, PG., HSC & SSLC

Notes
Syllabus
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www.AllAbtEngg.com

Text Book

1. Elements of Workshop Technology- Vol. I & II, Hajra Choudry & Battacharya, Edn. 11, published by Media Promoters and Publishers Pvt. Ltd., Seervai Buildings `B', 20-G, Noshir Bharucha Marg, Mumbai 400 007 – 2007.
2. Production Technology, Jain & Gupta, Khanna Publishers, 2-B, North Market, Naisarak, New Delhi – 110 006 – 2006.

Reference Book

1. Production Technology, HMT, Edn. 18, published by Tata McGraw Hill Publishing Co. Ltd., 7, West Patel Nagar, New Delhi 110 008.
2. Manufacturing process, Myro N Begman, , Edn. 5, Tata McGraw Hill Publishing Co. Ltd., 7, West Patel Nagar, New Delhi 110 008.
3. Workshop Tech Vol I,II, III, WAJ. Chapman, published by Viva Books Pvt. Ltd., 4262/3, Ansari Road, Daryaganj, New Delhi 110 002.
4. Production processes, NITTTTR, published by 5, Tata McGraw Hill Publishing Co. Ltd., West Patel Nagar, New Delhi 110 008.
5. Principles of the manufacturing of Composite materials – Suong V Hoa, DES tech publication. Inc, 439, North Duke street, Lancaster, Pennsylvania – 17602 U.S.A.