Diploma in Plastic Technology

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<tr>
<th>Sr. No.</th>
<th>Subject Name</th>
<th>Theory Hrs</th>
<th>Practical Hrs</th>
<th>Sem</th>
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<tbody>
<tr>
<td>1</td>
<td>Plastic Materials &amp; Applications</td>
<td>26</td>
<td>2</td>
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<td>2</td>
<td>Plastic Processing Techniques</td>
<td>42</td>
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<td>Plastic Testing Techniques</td>
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<td>4</td>
<td>Machine Maintenance</td>
<td>16</td>
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<td>5</td>
<td>Technology of Elastomers</td>
<td>20</td>
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<td>6</td>
<td>Costing &amp; Industrial Management</td>
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<td>7</td>
<td>Total (Theory + Practical Hrs)</td>
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<td>8</td>
<td>Industrial Visit</td>
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<td>9</td>
<td>Industrial Training</td>
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<td>Grand Total (7+8+9)</td>
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Plastic Materials & Applications

UNIT I HISTORY
Basic chemistry of polymers-nomenclature of polymers sources for raw materials- Natural Polymers - Shellac resin and natural rubber - Cellulosics - Cellulose nitrate, cellulose acetate, cellulose acetate butyrate, Ethyl cellulose & others.

UNIT 2 COMMODITY THERMOPLASTICS & ITS APPLICATIONS
Methods of manufacturing - general properties - processing behavior and applications of the following: Polyolefin - Polyethylene, LDPE, HDPE, LLDPE, HMHDPE, Polypropylene - Homopolymers - Copolymers - Polytirene & Styrene copolymers - Polystyrene, HIPS,
ABS, Styrene - Acrylonitrile Vinyl plastics - Polyvinyl chloride, Polyvinyl Acetate, Polyvinylidene chloride, Polyvinyl alcohol & others.

UNIT 3 ENGINEERING Plastic & ITS APPLICATIONS
UHMHDPE - EPDM – EVA - Polyamides - Nylons 6, 66, 6 10, 11, 12 etc. Acrylic Plastic - Polymethyl Methacrylate, Polyacrylonitrile - Polyesters - Polyethylene terephthalate, polybutylene terephthalate - Polycarbonate - Polycetals

UNIT 4 HIGH PERFORMANCE Plastic
Aromatic ether - Polyphenylene oxide, Aromatic thioether - Polyphenylene sulphide, Polysulfone, Polyimides – Polyimidazoles, Polyurethane, luoropolymers - Polyvinyl fluoride, Polyvinylidene fluoride, Polytetrafluoroethylene, Polychlorotrifluoroethylene.

UNIT 5 THERMOSET MATERIALS & ITS APPLICATIONS
Phenol formaldehyde - Urea formaldehyde - Melamine formaldehyde – Unsaturated polyesters, Alkyd resins - Epoxides - Polyurethane – Silicones - End use applications - case studies on applications – Moulding Powders


UNIT 7 Reinforced Plastic
principles of composite reinforcement, effect of reinforcement on strength of Plastic, Role and nature of binders and coupling agents, properties and applications of fibres in reinforcement (glass and carbon). Properties and applications of FRP’s (Thermoset & Thermoplastics: unsaturated polyesters, epoxies, PU, nylon) End use applications - case studies on applications 4

UNIT 8 Definition, advantages of polymers, blends and alloys, role of composition, properties and applications of parameters for compatibility, PVC – Nitrile rubber, ABS-PVC and PP-EPDM

UNIT 9 Polyolephines, Nylons & Polycarbonates with fillers like Glass, Mica, Talc, Caco, etc Polymer Concretes & Advanced ceramic

Books to refer
1. V.R. Gowariker, “Polymer Science” – New Age International (P) Ltd, Publishers
2. Hand Book of Plastics Materials & Technology - By Rubin, Irwin, J

Plastic Processing Techniques

PART I
Unit – 1 Processability of polymers and the role of rheology in polymer processing.
Unit – 2 General description of extrusion processes, type of extruders, screw and their output in terms of drag, leakage and pressure flow, influence of screw dimensions and output, die and screw characteristics. Design of barrel and screw for commodity, heat sensitive and engineering polymers. Barrier Screws.

Unit – 3 Individual extrusion systems, Dies, Sizing and Downstream equipments, Faults, Causes and Remedies for film, pipe, lamination, profiles, cables, sheet, Box Strapping.


Unit – 5 General description of Compression and Transfer moulding and its application in processing of thermosetting materials. Faults, Causes & Remedies.

PART II


Unit – 2 Process variables and their importance, temperature, pressure, injection rate, etc. Faults and remedies in injection moulding. Injection moulding of thermosets. Reaction injection moulding.

Unit – 3 Description of various thermoforming processes-simple vacuum, drape, bubble and plug assisted formings. Thermoforming and process variables affecting the product quality.

Unit – 4 General description of blow moulding processes, type of blow moulding machines, parison control, types of Dies, process variables, problems and their remedies. Stretch blow moulding.


Books to refer
3. Extrusion of Plastics By Fisher
Plastic Testing Techniques


UNIT –5 Product testing-pipe and fittings-film and sheets, Pipe and tube, blow bottle testing and FRP based products. Factors for designing tests for newer products. Factors affecting the quality of materials and products.

Books to refer

Machine Maintenance

UNIT 1 MAINTENANCE METHODS
Routine Maintenance, Scheduled Maintenance, Breakdown Maintenance

UNIT 2 HYDRAULIC PRINCIPLES
Principle of hydraulics, hydraulic pumps, radial piston pumps, axial piston pumps and tilted plate principle, pressure relief valve, directional control valve, hydraulic motors, Pressure control valve, volume control valve, strainers, filters, hoses, joints.

UNIT 3 ELECTRICAL CONTROLS
Electrical cum electronic control of injection moulding machine, operation of circuit, Semi-automatic operation, electronics and microprocessor-based components and equipment.

UNIT 4 MANAGEMENT OF PLANT AND MACHINERY MAINTENANCE
Manuals, Trained and dedicated Maintenance Man Power,, Electronic Technicians, Job Description of Maintenance Fitters

Books to refer
1. Plastics Technology, Midhat Luqman, CBS Publishers and distributors, New Delhi

Technology of Elastomers

Unit-1 Sources and history of natural and synthetic elastomers, significance of structure of elastomers. Mastication, compounding ingredients and methods of compounding. Reinforcing fillers and mechanism of reinforcement of elastomers.

Unit-2 Production of different grades of natural rubber from latex, modified and natural rubber derivatives, Reactions of rubber, application of latex, technically specified rubber, chemistry and technology of vulcanization.

Unit-3 Manufacturing processes, properties and application of synthetic elastomers viz. styrene-butadiene rubbers, Acrylonitrile-butadiene rubber, butyl rubber, polychloroprene rubber.

Unit-4 Manufacturing processes, properties and applications of ethylene-propylene rubber, polyurethane elastomers, chlorosulphonated polyethylene, polysulphide and silicon rubber, thermoplastic elastomers.

Unit-5 Industrial fabrication of rubber article such as transmission belts, hoses, tyres, purged goods, compounding and processing techniques, Direct manufacture of articles from latex.

Books to refer
1. C. Keith Riew, “Rubber toughened Plastics, American Society
2. John Dick,”Rubber Technology” Hanser Gardner Publications

Costing & Industrial Management

UNIT 1 PRINCIPLES OF MANAGEMENT ORGANISATION
Planning, organization, staffing, coordination, directing, controlling, Communicating, Organization as a process and structure: Types of organization.

UNIT 2 PRODUCTION MANAGEMENT
Method study; work measurement techniques; basic procedure; motion study; motion economy; principles of time study; elements of production control; forecasting; planning; routing; scheduling dispatching; cost and costs control, inventory and inventory control.

UNIT 3 ENTREPRENEURSHIP

UNIT 4 COSTING

Books to refer
1. Management By Koontz, Herold & Others.
2. Essentials of Management By Koontz, Herold & Weihrich.
3. Industrial Engineering and Management By Ravi Shankar.

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