PPE8J003 PLASTICS PRODUCT DESIGN USING CAD/CAM/CAE

UNIT I

Plastics Product Design : Material Selection - Properties – Mouldability - Fits and Tolerance – Shrinkage – Warpage - Wall Thickness – Fillets - Sharp Corners - Ribs and Bosses - Holes- Moulded Threads - Inserts and Fasteners – Integral hinge – Lettering on Moulded Products. Surface finish – Functional / Aesthetic aspects of part shape-Safety aspects of part shape - Safety aspects if the part should burn - Safety aspects if the part should fail - Use of color and design to promote safety.

UNIT II

Introduction to CAD/CAM –Wire frame model, Surface and Solid Modeling –NC Machines – NC Part Programming – Manual part programming – Computer assisted part programming – APT Language – Manual data input – NC Programming using CAD/CAM
– Computer automated part programming.

UNIT III

Finite element analysis - introduction, types of analysis - need for approximation - Weight residual, Ritz and Galerkin method - Variational. Procedure for finite element analysis - stiffness matrix, solution procedure, details of finite element analysis package, model building, post processing

UNIT IV

Introduction to CAE for plastics– Design principles for part design, Analysis using CAE software. Case studies – Interpretation of results. Identification of Uneconomical design-redesign for manufacture.

Rapid Prototyping – Streolithography – Laminated Object Manufacturing, Selective Laser Sintering – Solider – Vacuum Casting – Resin injection – Application of rapid prototyping. Rapid Tooling – Cast – IT Epoxy Tooling System, Parts in Minutes – Vacuum grade Polyurethanes, Composite tooling board.

Total Lecture: 35 Hours

Reference Books

1. Technology of Computer Aided Design and Manufacturing, S Kumar & A K Jha, Danpatrai & Co, 1998
2. Tucker III, C L, Fundamentals of Computer Modeling for Polymer Processing, Hanser, 1989
3. R.D.Beck Plastics Product Design,
4. C-B & Liv C.N.K. Computer aided design & manufacture, East West Press.

4. Durvent W.R. The Lithographic Hand book, Narosa Pub., 1995. Paul F. Jacob. Rapid Prototyping and manufacture Fundamentals of Stereolithography, 1985