

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: I

Plastic Engineering

Subject Name: **Advanced Tool Design(Major Elective-I)**

Sr.No	Course content
1.	Runnerless Moulds Nozzle types – Hot runner unit moulds – Manifold Block Design – Inlet Aperture Design – The melt flow way – Expansion problem – Types of secondary nozzles – Valve systems – Heating systems – Hot runner unit grid – Insulated runner mould – Hot runner plate mould – Standard mould systems - Quick mould change system.
2.	Automatic Unscrewing Moulds Component design – Single interrupted thread design – collapsible core design – Automatic unscrewing moulds for internally threaded components – Axially fixed rotating core – withdrawing rotating core – Layout of impression – In line layout – pitch circle layout – power and transmission system – Archimedean screw design – Automatic unscrewing mould for externally threaded components – Mould construction for pitch circle and in line layout – Standard unscrewing type mould systems.
3.	Mould design – Structural foam moulding – Gas assisted injection moulding – Low pressure and vacuum moulding of polyurethane (RIM) casting – Resin transfer moulding insert and outset moulding – Mould Design checklist. – Case studies.
4.	Design standard for inserts – Types of inserts – Selection of metal for inserts – Minimum wall thickness of material around inserts – Anchorage – Preparation of inserts before moulding – problem in moulding usual types of inserts – Comparison of inserts – Don'ts in insert design.
5.	Rapid prototyping & reverse engineering – 3 D laser digitizing – Influence of CAD/CAM/CAE in tool design – Finite element analysis (FEA) – Gate & runner design through mould flow analysis – Thermal analysis – Warpage & shrinkage analysis – Cooling analysis – Pressure analysis – Mould design checklist – Case studies.

Reference Books:

1. James M. Margolis, Advanced Thermoset Composites, Van Nostrand Reinhold Company, New York, 1986.
2. John J. Morena, Advanced Composite Mould Making, Van Nostrand Reinhold Company, New York, 1988.
3. B dye, Injection Mould Design, Affiliated East-West Press P.Ltd., New Delhi, 1989.
4. Gastrow, 108-Proven Design, Hanser Publishers Munich, New York, Barcelona, 1993.
5. Belosky, Plastic Product Design, Hanser, Germany, 1995.