

LESSON PLAN

Name of Faculty: Sunil Kumar (Theory)/ Rahul Singh (Practical)

Discipline: Plastic Engineering.

Semester: 4th

Subject: PLASTIC PROCESSING TECHNIQUES-II

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 3 PERIODS/ 4 PERIODS

Wee k	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1 ST	1	General principles and working of compression molding machine	1	To produce small components on hand operated compression molding machine
	2	Types of compression molding machine – hand operated, automatic single and multi daylight machines,		
	3	bulk factor, preheating of molds, cycle time,		
	4	process variables and their control		
2 ND	5	Common faults and their remedies.	2	To produce components on automatic compression molding machine
	6	Principles of transfer molding.		
	7	Types of transfer molding machines,		
3 RD	8	molding cycle faults causes and remedies.	3	To determine various defects and their remedies in Compression moulding process
	9	Comparison between compression and Transfer Moulding.		
	10	Basic principles, method of thermoforming		
4 TH	11	straight forming drape forming	4	To produce articles on vacuum forming machine

	12	matched mold forming, snap back forming,		
5 TH	13	reverse draw forming and vacuum forming,	5	To determine various defects and their remedies in Vacuum forming process
	14	Class Test-II		
	15	limitations and advantages of forming,		
6 TH	16	types of heating systems,	6	To do casting of polyester resin.
	17	faults: causes and their remedies.		
	18	Hand Lay-up technique Spray- up technique		
7 TH	19	bag moulding	7	Exercises on high frequency PVC welding machine
	20	Filament winding,		
	21	centrifugal casting, pultrusion.		
8 TH	22	Introduction, Plastics materials used in casting	8	To study various parts and

	23	casting Techniques for Thermoplastic		operating conditions of transfer moulding machine
	24	casting Techniques for Thermoset		
9 TH	25	casting Techniques for and Biodegradable Plastics		
	26	Forms of Plastics Materials used in Casting Techniques.		
	27	Casting techniques used with Plastics materials like Cell casting		
10 TH	28	Potting and encapsulation,		
	29	CLASS TEST 3		
	30	film casting,		
11 TH	31	Mould Casting		
	32	Embedding,		
	33	Plastisol Casting		

12 TH	34	Dip casting		
	35	Slush Casting.		
	36	Post Processing and Finishing of Plastics		
13 TH	37	Engraving technique contd.		
	38	Engraving technique technique		
	39	vacuum metalizing contd.		
14 TH	40	vacuum metalizing		
	41	Painting technique		
	42	Electroplating contd.		
15 TH	43	Electroplating		Viva voce and final evaluation
	44	Revision		
	45	Unit 5 th complete		

LESSON PLAN

Name of Faculty: Pankaj Garg (Theory)

Discipline: Plastic Engineering.

Semester: 4th

Subject: Plastic Materials & Properties-II

Lesson plan Duration: 15 WEEKS

Work Load (Lecture) per week: 3 PERIODS

Week	THEORY	
1 ST	Lecture	TOPIC
	DAY	Unit 1: Introduction
	1	Introduction to Engineering thermoplastics
	2	Preparation of Engineering, thermoplastics
	3	properties and application of Engineering, thermoplastics
2nd	4	Poly Ether Ether Ketone (PEEK),
	5	Poly Phenylene Oxide (PPO),
	6	Poly-sulphones (PSO) ,
3rd	7	Poly Tetra Flouro Ethylene (PTFE),
	8	Liquid Crystalline Polymer (LCP)
	9	Poly acetals (POM),
4 th	10	UNIT II Reinforced Plastics
	11	Introduction to Reinforced Plastics
	12	carbon fiber preparation and properties

5 th	13	Poly Ether Sulphones (PES)
	14	Principles of composite reinforcement,
	15	Effect of reinforcement on strength of plastics.
6 th	16	fillers and additives,
	17	Various types of reinforcement fibers,
	18	Unsaturated Polyester,
7 th	19	Coupling agents.
	20	glass fiber preparation and properties
	21	Aramid fiber.
8th	22	Concept of Nano-composite polymers.
	23	UNIT III Poly-blends and Alloys
	24	Definition, advantage of polymers blends
9 th	25	Alloys and their advantages
	26	role of composition
	27	Interpenetrating polymer networks (IPN)
10 th	28	PVC- Nitrile rubber,
	29	ABS-PVC and PP-EPDM
	30	alloys,
11TH	31	role of composition
	32	Class test 2
	33	UNIT IV Emerging Materials and Applications
12 th	34	Preliminary concept of new materials

	35	conducting polymers
	36	biopolymers, opto-electronic plastics
13 th	37	polymer concretes
	38	Use of polymers in new applications
	39	food packaging, biomedical membrane separation.
14TH	40	UNIT V : Thermoplastic Elastomers
	41	Basic properties and applications of the following
	42	Styrene block copolymer
	43	Thermoplastic polyurethane elastomers
15 th	44	co-polyester elastomers
	45	Thermoplastic poly-olefins.
		Class Test 3

LESSON PLAN

Name of Faculty: Rahul Singh(Theory) / Sunil Kumar (Practical)

Discipline: Plastic Technology

Semester: 4th

Subject: PLASTIC TESTING AND QUALITY CONTROL

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 3 PERIODS/ 4 PERIODS

Wee k	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practica 1 DAY	TOPIC
1 ST	1	UNIT I Concept of Testing & Quality Control	1	To determine the tensile strength, flexural strength of plastics specimen.
	2	Basic concepts of testing,		
	3	overview of various test standards		
	4	Test specimen preparation: preconditioning		To determine water absorption of various plastics.
2 ND	5	Basic concept of statistical quality control, Statistical process control	2	
	6	kaizen, three-sigma, 5S and root cause analysis		
	7	Analysis of test data to control finished product in relation to service requirement		To determine impact strength of different plastics specimen.
3 RD	8	CLASS TEST-I	3	
	9	UNIT II Mechanical Testing		
	10	Visual examination, Physical Identification test for identification of Plastics		To determine hardness (Shore and Rockwell) of different specimen of plastics.

	11	Specific gravity, bulk density and Water absorption, Tensile strength, flexural		
	12	fatigue resistance,		
5 TH	13	compression strength, impact strength (Izod & Charpy)	5	To carry out dart impact test on given plastics films/laminates.
	14	Dart impact for films, tear test, creep and stress relaxation		
	15	Hardness test – Shore, Rockwell and Brinell hardness, Abrasion resistance		
6 TH	16	UNIT III Thermal and Flammability Test	6	To determine the Melt Flow Index of given samples of plastics.
	17	Flame test for identification of Plastics,		
	18	Vicat softening point (VSP)		
7 TH	19	Limiting oxygen index	7	To carry out Heat detection test on

	20	heat distortion temperature,		given samples of plastics
	21	Melt flow index		
8 TH	22	Flame test for identification of Melting point,	8	To carry out vicat softening point test on given samples of plastics
	23	Smoke density test.		
	24	Flammability Test		
9 TH	25	CLASS TEST-II	9	To carry out environmental stress cracking resistance test on given samples of plastics
	26	UNIT IV Electrical and Optical Test		
	27	Dielectric strength,		
10 TH	28	volume resistivity	10	Identification of Plastics by Simple methods / primary tests like visual examination, solubility test, burning and odor test.
	29	arc resistance		
	30	dielectric constant		
11 TH	31	surface resistivity	11	To determine volume and surface resistivity of different plastics specimens.
	32	refractive index		

	33	Luminous transmittance		
12 TH	34	Clarity and Haze	12	To determine gloss of different plastics specimens.
	35	Colour measurement		
	36	Gloss.		
13 TH	37	insulation resistance,	13	To perform tear testing on plastics specimens.
	38	UNIT V Chemical and Weathering Testing:		
	39	Solubility test for identification of Plastics		
14 TH	40	Environment Stress cracking resistance		
	41	Accelerated weathering tests		
	42	outdoor weathering of plastics,		
15 TH	43	Resistance of plastics to biological systems		Viva voce and final evaluation
	44	Revise the all syllabus		
	45	CLASS TEST-III		

LESSON PLAN

Name of Faculty: Ajay Kumar (Theory + Practical)

Discipline: Plastic Engineering.

Semester: 4th

Subject: DESIGN OF DIES AND MOULDS – II

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 2 PERIODS/ 4 PERIODS

Week	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1 ST	1	UNIT I Introduction to Extrusion Dies	1	Draw split and plate dies for solid sections.
	2	General features of extrusion dies,		
	3	design features like characteristic of polymers	2	Draw pipe die (In-line type and offset type).
2 ND	4	polymer melt flow, die geometry		
	5	material of construction,	3	To draw side fed die for blown film.
3 RD	6	heating system and temperature control		
	7	Ease of maintenance and cleaning.	4	To draw bottom fed die for blown film.
4 TH	8	General features of Die materials		
	9	strength and rigidity	5	To draw rotating tubular die for blown film.
5 TH	10	CLASS TEST-I		
	11	UNIT II Types of Extrusion Dies	6	To draw axial flow crosshead parison die
6 TH	12	Dies for solid sections (like rods)		
	13	hollow sections (like pipes and tubes)	7	To draw radial flow crosshead parison die
7 TH	14	dies for blown films,		

8 TH	15	parison dies, flat film wire and cable Coating. Sheet dies	8	Drawing of flat film dies like fish tail, coat hanger die.
	16	UNIT III Compression Mould Design		
9 TH	17	Types of compression moulds – hand compression moulds, semi-automatic moulds	9	To draw adjustable core die and die for core deflector for wire and cable coating
	18	Open flash, semi-positive and positive type		
10 TH	19	Calculation of clamp pressure, ram pressure, platen size	10	Drawing of Open flash, semi positive and positive type compression moulds.
	20	number of impressions		
11 TH	21	type of loading chamber design	11	To draw a Pot type transfer mould
	22	CLASS TEST-II		
12 TH	23	UNIT IV Transfer Mould Design	12	To draw a Plunger type transfer

	24	Principles of transfer moulding, pot capacity, design of sprue, runner and gates,		To draw various types of pinch off design
13 TH	25	types of Transfer moulds- pot transfer, plunger transfer, Transfer pot calculations,	13	To draw layout of a Blow mould.
	26	Calculation of Clamp pressure, ram pressure, platen size, no. of impressions.		
14 TH	27	UNIT V Blow Mould Design	14	Viva voce and final evaluation
	28	Materials for Blow moulds, Extrusion blow moulds - cavity and pinch off		
15 TH	29	injection blow moulds - neck design, mandrel design, and parison thickness contro		
	30	CLASS TEST-III		

LESSON PLAN

Name of Faculty: PankajGarg /Ajay Kumar/Rahul Singh

Discipline: Plastic Engineering.

Semester: 6th

Subject: Major Project

Lesson plan Duration: 15 WEEKS

Work Load (Practical) per week: 5 PERIODS

WEEK	PRACTICAL	
	PRACTICAL DAY	TOPIC
1 ST	1	Selection of project assignment
2 ND	2	Planning and execution of considerations
3 RD	3	Planning and execution of considerations
4 TH	4	Quality of performance
5 TH	5	Providing solution of the problems or production of final product
6 TH	6	Providing solution of the problems or production of final product
7 TH	7	Sense of responsibility
8 TH	8	Sense of responsibility
9 TH	9	Self expression/ communication skills
10 TH	10	Self expression/ communication skills
11 TH	11	Interpersonal skills/human relations

12TH	12	Interpersonal skills/human relations
13TH	13	Report writing skills
14TH	14	Report writing skills
15TH	15	Checking of project file, viva and evaluation

LESSON PLAN

Name of Faculty: Pankaj Garg

Discipline: Plastic Engineering.

Semester: 6th

Subject:-PLASTIC PRODUCT DESIGN

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 03 PERIODS

Week	THEORY	
	1 ST Lect per DAY	TOPIC
1 ST		Unit 1: Introduction
	1	Introduction to Plastic Product Design
	2	Preliminary design considerations
	3	Design steps for plastic product,
2nd	4	Unit 2 Materials Selection
	5	Various materials for Plastic Product
	6	Selection of material for particular application
3rd	7	Short Term Properties
	8	Cost economics
	9	Various processing limitations
4 th	10	Effects of environmental exposure
	11	Limitations of Product Design
	12	Class Test 1

5 th	13	Unit 3 Product Design Features , Surface finish
	14	Texturing
	15	Positioning of holes
6 th	16	Ribs
	17	Fillets
	18	Wall thickness
7th	19	Unit 4 Design Activities Introduction
	20	Stages of product development
	21	Feasibility study
8 th	22	Class test 2
	23	Unit 5 Method of joining
	24	welding
9 th	25	Riveting
	26	Types of Rivetings
	27	Cementing, Types of Cementing

10 th	28	Adhesion
	29	Types of Adhesion
	30	Sampling & its types
11 th	31	Drilling
	32	Assembly methods
	33	Weld lines
12 th	34	Draft angles
	35	Gate side and location
	36	Internal plastics threads
13 th	37	Undercuts, Tolerance

	38	Functional surfaces
	39	Letters and alphabets
14 th	40	Gate side and location
	41	Case study of statically Loaded part
	42	Dynamically loaded plastic product
15 th	43	Gears & its design, Spring & its design
	44	Various others plastic parts
	45	Class test 3

LESSON PLAN

Name of Faculty: Ajay Kumar

Discipline: Plastic Engineering.

Semester: 6th

Subject:- PROGRAMME ELECTIVE II (POLYMER COMPOSITES)

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 03 PERIODS

W ee k	THEORY	
1 ST	Lecture DAY	TOPIC
		UNIT I
	1	INTRODUCTION
	2	Types of Reinforcements Fiber
	3	Reinforcements fibers,
2nd	4	Types of fibers
	5	long and short fibers
	6	Particulates of fibers
3rd	7	Application area,
	8	Classification of Reinforced Plastics.
	9	FRP (fiber reinforced plastics)
4 th	10	Particulate reinforced plastics
	11	Laminates/panels

	12	Class Test 1
5 th	13	UNIT II Fiber Reinforced Plastics
	14	Types of Fibers: carbon, glass fibers (E-glass), natural fibers (jute, aramid etc.)
	15	man-made fibers (acrylic, nylon, (PAN), FRPs
6 th	16	Preparation, properties and applications of FRPs including
	17	Glass fiber reinforced polyesters - Glass fiber reinforced epoxies
	18	Glass fiber with polyurethanes - Carbon fiber reinforced epoxies, polyesters
7 th	19	Nature fiber reinforced polyesters
	20	UNIT III Particulate Reinforced Plastics (PRP)
	21	Different types of particulates;
8 th	22	talc, mica, carbon black, silica, fly ash
	23	Fly ash, reinforced epoxies,
	24	CaCO ₃ , Metallic powder)
9 th	25	polyesters,
	26	Silica reinforced polyurethanes and epoxies
	27	Preparation of FRP

10 th	28	properties and applications of PRPs
	29	metal particles filled polyurethanes, epoxy
	30	Talc reinforced silicones.
11 th	31	Class test 2
	32	UNIT IV Nano-composites
	33	Introduction to Nano-particles
12 th	34	Nano-composites based on Nano clay and their types and applications
	35	carbon nano tubes, application and manufacturing methods of nano-composites
	36	UNIT V Types of laminates

13 th	37	Rigid and flexible laminates Plastic
	38	plastic laminates
	39	Plastic –other material
14 th	40	(plastic–wood, plastic-paper, plastic-metal etc.
	41	Laminates preparation, properties
	42	applications of following laminates
15 th	43	Packing material of potato chips and biscuits
	44	- Plywood
	45	Class test 3

LESSON PLAN

Name of Faculty: Sunil Kumar (Theory + Practical)

Discipline: Plastic Technology

Semester: 6th

Subject: MAINTENANCE OF PLASTIC PROCESSING MACHINES

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 3 PERIODS/ 2 PERIODS

We ek	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practi cal DAY	TOPIC
1 ST	1	UNIT I Maintenance and its types	1	To check the alignment and leveling of PVC pipe plant,
	2	Maintenance		
	3	Importance of Maintenance		
2nd	4	objective of maintenance	2	To check the alignment and leveling of injection moulding machine
	5	preventive maintenance		
	6	importance of maintenance		
3rd	7	break-down maintenance	3	To check the alignment and leveling of extrusion and blow moulding machine.
	8	predictive maintenance		
	9	schedule maintenance		
4 th	10	maintenance planning	4	Maintenance of Hydraulic system such as pumps, motors, valves, O-rings, oil seals.
	11	Total productive maintenance.		
	12	Class Test 1		

5 th	13	UNIT II Commissioning and alignment of machines	5	To carry out lubrication and use of lubrication system in machines such as Injection moulding, Blow moulding machines.
	14	Factors to be considered installation/erection and commissioning of plastic processing machinery		
	15	Vibrations and foundation. General method of alignment/ leveling.		
6 th	16	UNIT III Repair and maintenance of following electrical equipments	6	Repair and maintenance of Pneumatic System like air compressors and valves.
	17	Electrical induction motors (slipping motors and squirrel cage motors)		
	18	their characteristics		
7th	19	Circuit breakers	7	Study and demonstration of various transmission systems (i.e. gears, V-belts, chains, rope).
	20	Oil circuit breakers		
	21	Brief introduction to limit switches		
8 th	22	relays, temperature controllers	8	Use of Precision equipments (such as vernier calipers,
	23	timers		

	24	variable speed motors		micrometer etc.) for measurement of Dim.
9 th	25	Speed control-Starters	9	Maintenance of mould, die, screw and barrel.
	26	Air circuit breakers		
	27	miniature circuit breakers		
10 th	28	thermocouples, heaters	10	To carry out breakdown maintenance of electrical equipments.
	29	ordinary and ceramic type		
	30	Study of safety rules and regulations		
11 th	31	Class test 2	11	Study of temperature control with thermocouples and timer (Digital & Analogue).
	32	UNIT IV Repair and maintenance of plastics processing machinery		

	33	Repair and maintenance of plastics processing machinery		
12 th	34	Barrel, screw, thrust unit, primary gearboxes	12	Hydraulic and Pneumatic Trainer Kit.
	35	calendar roll, mill rolls		
	36	Pumps such as gear pump, piston pump, radial/axial pump and screw pump		
13 th	37	UNIT V Repair and Maintenance of Valves		
	38	Valves, valve sequences, valve counted balance, break valve, pressure reducing valve		
	39	different control valves, solenoid valves		
14 th	40	Hydraulic motors, hydraulic actuators and pneumatic controls		
	41	filters, compressors, oil seeds, o-rings Lubrication system		
	42	central lubrication system		
15 th	43	Transmission system		Viva voce and Final Evaluation
	44	Gears, v-belts, chains.		
	45	Class test 3		