Lesson Plan
Plastic Engineering
1st Semester

Lesson Plan- IPST		
Week	**Name of Faculty- Sh. Ajay Kumar (Theory)** **Discipline- Plastic Engg.** **Subject- IPST Sem. 1st Lesson plan duration-15 week**	
1ST	Lecture DAY	Topic
	1	**Unit – I: Introduction to Polymer Science**
	2	Brief History of Polymers
	3	Physical State of Polymer Crystalline, Amorphous.
	4	Effect of Physical State on polymer properties
2ND	5	Introduction to Rheology- Definition, properties and classification of fluids
	6	Newton's Law of Viscosity, Types of Viscosity
	7	Effect of Temperature on Viscosity , Effect of Viscosity on Motion, Classification of flow
	8	Maxwell and voigt model of visco-elasticity, Classification of materials on the basis of visco-elasticity
3rd	9	**Unit –II: Molecular weight of Polymers**
	10	Molecular weight distribution
	11	practical significance of Polymer Molecular weight
4TH	12	Poly Dispersity Index (PDI)
	13	Molecular Weight and its determination
	14	by dilute solution viscometry
	15	end group analysis
5TH	16	membrane osmometry
	17	Vapour phase osmometry
	18	cryoscopy
	19	ebulliometry
6TH	20	light scattering

	21	centrifugation
	22	Gel permeation chromatography
	23	**Class Test-I**
7TH	24	**Unit III– Physical State of Polymers**
	25	Polymer solutions and solubility
	26	General Rules for Polymer solubility
	27	Solubility Parameters
8TH	28	Properties of Dilute solutions
	29	Physical State of Polymer
	30	Crystalline, Amorphous and their relation to processing and applications.
	31	**Unit – IV Thermal transitions in polymers**
9TH	32	Glass transition temperature, its importance
	33	Factors influencing Glass transition temperature (Tg)
	34	Techniques for its determination
	35	melting temperature
10TH	36	Relationship of polymer properties with structure.
	37	**Unit – V Polymer Rheology**
	38	Chemical Modification - introduction of Co-polymerization
	39	Importance of copolymers, different types of copolymers, copolymer equation
11TH	40	Reactivity ratios.
	41	Physical modification
	42	Polymer blends and alloys, introduction to composites.
	43	**Class test - II**
12TH	44	**Unit –VI: Chemistry of Polymerization**
	45	Chain growth Polymerization

	46	Free Radical Reaction
	47	Ionic Reaction
13TH	48	Coordination Polymerization
	49	Step Growth Polymerization
	50	Condensation Polymerization
	51	Ring Opening Polymerization.
14TH	52	Co-polymerization
	53	Importance of copolymers, different types of copolymers
	54	copolymer equation, reactivity ratios
	55	**Unit – VII: Techniques of Polymerization:**
15TH	56	Bulk, Solution,
	57	Suspension and Emulsion Polymerization
	58	their advantages and disadvantages
	59	**Class Test-III**
	60	**Revision**

Lesson Plan- Engg. Graphics	
Name of Faculty- Sh. Sunil Kumar **Discipline- Plastic Engg.** **Subject- Engg. Graphics** **Sem. 1st Lesson plan duration-15 week**	
Week	Topics
1st	Introduction to use and care of drawing instruments, drawing materials, layout and sizes of drawing sheets and drawing boards. Symbols and conventions- a) Conventions of Engineering Materials, Sectional Breaks and Conventional lines. b) Civil Engineering Sanitary fitting symbols c) Electrical fitting symbols for domestic interior installations. Geometrical construction-geometrical figures such as triangles, rectangles, circles, ellipses Definition and classification of lettering, Free hand (of height of 5,8,12 mm) and instrumental lettering (of height 20 to 35 mm): upper case and lower case, single and double stroke, vertical and inclined (Gothic lettering) at 75 degree to horizontal and with suitable height to width ratio 7:4. and curves, hexagons, pentagons bisecting a line and arc , division of line and circle with the help of drawing instruments.
2nd	Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions). Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., countersunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.
3rd	Scales –Needs and importance (theoretical instructions), Type of scales, Definition of Representative Fraction (R.F.) and Length of Scale. To draw/construct plain and diagonal scales.
4th	Theory of orthographic projections (Elaborate theoretical instructions). Three views of orthographic projections of different objects of given pictorial view of a block in 1st and 3rd angle.
	Projection of Points in different quadrant
	Projection of Straight Line (1st angle)
	i. Line parallel to both the planes.
	ii. Line perpendicular to any one of the reference plane and parallel to others
	iii. Line inclined to any one of the references and parallel to another plane.
5th	Projection of Plane – Different lamina like square rectangular, triangular, circle and Hexagonal pentagon. Trace of planes (HT and VT).
	Identification of surfaces.
6th	Importance and salient features
	Drawing of full section,
7th	half section, partial or broken out sections
8th	Offset sections, revolved sections and removed sections (theoretical only).
	Orthographic sectional views of different objects.

9th	1. Introduction of projection of right solids such as prism & pyramid (square, Pentagon, Hexagonal) cube, cone & cylinder (Axes perpendicular to H.P and parallel to V.P.)
10th	2. Introduction of sections of right solids - Section planes, Sections of Hexagonal prism, pentagon pyramid, cylinder and cone (Section plane parallel to anyone reference planes and perpendicular to V.P. and inclined to H.P.)
11th	3. Development of Surfaces – Development of lateral surfaces of right solids like cone, cylinder, pentagonal prism, pyramid and hexagonal pyramid (Simple problems)
12th	1. Fundamentals of isometric projections and isometric scale.
	2. Isometric views of different laminas like circle, pentagon and hexagon.
13th	3. Isometric views of different regular solids like cylinder, cone, cube, cuboid, pyramid and prism.
	4. Isometric views from given different orthographic projections(front, side and top view)
14th	Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets of different objects on AutoCAD (given pictorial/isometric view of a block).
15th	AutoCAD skill of student is evaluated in internal assessment only not in external exam.

Lesson Plan
Plastic Engineering
3rd Semester

LESSON PLAN

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

Discipline: Plastic Engineering

Semester: 3rd

Subject: PPT-I

Lesson plan Duration: 15 WEEKS

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

Week	THEORY		PRACTICAL	
	Lecture	**TOPIC**	**Practical**	**TOPIC**
1ST	1	**Unit–I: Extruder and its components.**	1	To draw the layout of plastic processing laboratory.
	2	General principles of operation		
	3	function of various parts, barrel, screw, screen pack,		
2ND	4	breaker plate, adaptor.	2	Setting up of the extruder for production of pipe (Including diefitting and centering).
	5	die (attachment with extruder general geometry of die swell)		
	6	Cooling system, Haul off system,printing		
3RD	7	Nip rolls, bubble casing	3	To identify various defects of pipes and suggest their remedies.
	8	winding equipment, cutting devices		
	9	stretching and orientation		
4TH	10	**Revise Syllabus/ Viva-Voice**	4	To study process of Blown filmPlant.
	11	**Class Test-I**		
	12	**Unit –II: Extruder and importance of screw.**		
5TH	13	single screw and twin-screw extruder	5	To identify various defects of Blown films and suggest their remedies.
	14	vented barrel extruder		
	15	Screw and its construction, pitch, channel.		
6TH	16	Introduction to land width, helix angle	6	To study corrugated sheetextrusion plant.
	17	screw diameter, root diameter, channel depth, land		
	18	types of screws used in extrusion		
7TH	19	two stage venting screw.	7	To study corrugated pipeextrusion plant.
	20	Introduction to screw cooling,		
	21	L/D ratio and its significance.		

8TH	22	**Revise Syllabus Viva-Voice**	8	Study of construction and working of wire and cable coating plant.
	23	**Unit – III: Extrusion processes.**		
	24	Blown film extrusion and pipes		
9TH	25	extrusion of sheets	9	To identify various defects of wire and cable samples and suggest their remedies.
	26	simple and corrugated		
	27	wires and cables, filaments uses		
	28	**Revise Syllabus Viva-Voice**		
	29	**Class Test-II**		
	30	**Unit –IV: Advance Extrusion processes:**		
11TH	31	Introduction to co extrusion		
	32	Multi-layer blown films, uses and application		
	33	coextruded sheets.		
12TH	34	coextruded pipes		
	35	Its application, uses and properties.		
	36	**Revise Syllabus Viva-Voice**		
13TH	37	**Unit –V: Calendaring process**		
	38	Introduction		
	39	Blending, scrap and cold trimming		
14TH	40	Mills and strainers types of calendars		
	41	take-off stripper section, embosser		
	42	advantages of calendaring over extrusion		
15TH	43	various calendaring defects and their remedies		Viva voce and final evaluation
	44	**Revise Syllabus**		
	45	**Class Test-III**		

LESSON PLAN

Name of Faculty: Sh. Rahul Singh (Theory)

Discipline: Plastic Engineering

Semester: 3rd

Subject: PMP-I

Lesson plan Duration: 15 WEEKS

Work Load (Lecture) per week: 3 PERIODS

Week	THEORY	
	Lect. Day	**TOPIC**
1ST	1	**Unit- I : Commodity Thermoplastics.**
	2	Preparation (brief description)
	3	Its types and properties.
2ND	4	Applications of the Followings: -
	5	Poly Ethylene's
	6	LDPE, LLDPE its types, properties and application.
3RD	7	HDPE its types, properties and application.
	8	UHMWHDPE its types, properties.
	9	Poly Propylene (PP), Poly Vinyl Chloride (PVC)
4TH	10	Its types, properties and application.
	11	**Revise Syllabus**
	12	**Viva- Voice**
5TH	13	**Unit- II : Engineering Thermoplastics:-**
	14	Poly Carbonate General Purpose, its application
	15	Poly Styrene-General Purpose, its application
6TH	16	High impact Poly styrene.
	17	Styrene Acrylonitrile, Polymethyl methacrylate.
	18	Acrylonitrile-butadiene-styrene, Polyamides.
7TH	19	Cellulose plastics
	20	Thermoplastic polyester (PET, PBT)
	21	**Revise Syllabus Viva- Voice**
8TH	22	**Unit- III : Thermosetting Plastics:** Properties and applications of the following
	23	Phenol formaldehyde
	24	Urea formaldehyde

9TH	25	Melamine formaldehyde
	26	Poly urethanes
	27	Silicone resins, Epoxy resin, Unsaturated polyesters. Its types.
10TH	28	**Revise Syllabus**
	29	**Viva- Voice**
	30	**Class Test-II**
11TH	31	**Unit- IV: Elastomers I**
	32	Basic knowledge of preparation.
	33	And its types, properties and applications Natural rubber, Styrene butadiene rubber
12TH	34	Chloroprene,
	35	Poly-isoprene,
	36	**Revise Syllabus**
13TH	37	**Viva- Voice**
	38	**Unit- V : Elastomers II**
	39	Poly-butadiene
14TH	40	Ethylene propylene
	41	diene monomer
	42	Nitrile butadiene rubber
15TH	43	Silicone rubbers
	44	**Revise Syllabus**
	45	**Viva- Voice**

LESSON PLAN

Name of Faculty: Pankaj Garg (Practical)
Discipline: Plastic Engineering.
Semester: 3rd
Subject: Computer Aided Mould Design (CAMD) Lab
Lesson plan Duration: 15 WEEKS
Work Load (Practical) per week: 4 PERIODS

PRACTICAL		
PRACTICAL WEEK	**TOPIC**	
1st	1	Introduction to AutoCAD: Starting up, practice on – how to createa new drawing file, setting drawing limits & saving a file
2nd	2	Drawing lines in different ways using absolute co-ordinates, user coordinates, WCS, UCS, drawing circles, drawing arcs, drawing ellipses. Drawing polygons, drawings splines, Drawing polylines, using window, zoom commands
3rd	3	Practice on Edit commands such as erase, copy, mirror, array,offset, rotate, oops, undo, redo, scale, stretch command
4th	4	Practice on trim, break, extend, chamfer, fillet, O snap command;Draw orthographic views of simple objects
5th	5	Practice on Text commands: editing text, text size, text styles,change properties commands
6th	6	Practice on Layer Commands: creating layer, freeze, layer on/off,lock & unlock layer, move from one layer to other.
7th	7	Viva of Syllabus covered

8th	8	Practice on Dimensioning, linear dimensioning, angular dimensioning radius/diameter dimensioning, snap command, aligned dimensioning; applying tolerance; Editing of dimensioning
9th	9	Practice on print commands. Export commands Practice on plot commands. Import commands
10th	10	Practice on making complete drawings of Stepped pulley and V-belt pulley using AUTOCAD (2D)
11th	11	Practice on 3D drawing: drawing cube, sphere, cylinder, cone; 3Dmodeling: Transformation, translation, scaling, rotation etc. Isometric drawing
12th	12	Introduction and practice on 3D Modeling using AutoCAD software including various commands like Extrude, Revolve, Blend, Helix, Sweep, Holes, Ribs & Bosses etc. and practice thesecommands making 3D design of different plastics.
13th	13	Analysis and Report Generation for calculating stresses on variousdesigns and structures.
14th	14	Design of various components used in plastic industries like pulleyetc.
15th	15	Final viva and evaluation

LESSON PLAN

Name of Faculty: Sh. Rahul Singh (Theory)/ Sh. Ajay Kumar (Practical)

Discipline: Plastic Engineering

Semester: 3rd

Subject: DDM-I

Lesson plan duration: 15 WEEKS

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

Week	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1ST	1.	**Unit-I: General Mould construction**: Basic terminology.	1	To draw basic mould consisting of cavity and core plate.
	2.	Mould cores., Mould cavities.		
2ND	3.	Bolster and its types, Ancillary item.	2	To draw types of cavity and core inserts (Rectangular, circular)
	4.	Guide bush and Guide pillar.		
3RD	5.	Sprue bush, Register ring, its types.	3	To draw guide pillar and guide bush (standard)
	6.	Mould plate fastening, attachment of mould to platen.		
4TH	7.	Classification of moulds.	4	To draw rectangular and circular frame type ejector grid.
	8.	Integer mould, Insert mould.		
5TH	9.	Split and runner-less mould, two and three plate.	5	To draw various types of ejector elements.
	10.	Hot runner mould, introduction to materials. Brief introduction to materials.		
6TH	11.	Material used for moulds and materials.	6	To draw and illustrate balanced runner layouts.
	12.	**Revise Syllabus and Viva Voice**		
7TH	13.	**Unit-II: Ejection System:**	7	To draw Integer cavity plate cooling circuit (Z

	14.	Ejector Grid, its assembly.		and balanced Z)
8TH	15.	Ejection Techniques, sprue pullers.	8	To draw Integer core cooling circuits (angled hole baffled straight hole, stepped)
	16.	**Revise the Syllabus Viva-Voice**		
9TH	17.	**Unit-III: Feed System: Runner**	9	Design of Multi impression two plate Injection Mould
	18.	Sprue and its use, types of Runner		
10TH	19.	Balancing and size of runners.	10	Design of Three Plate Injection Mould (multi-Impression)
	20.	Gates - Types of gates.		
11TH	21.	**Revise the Syllabus Viva-Voice**	11	Design of Injection Mould for internal undercut components.
	22.	**Unit-IV: Parting surface:**		
12TH	23.	Introduction to Parting surface its type	12	To design and draw a runner less mould.
	24.	Selection of parting surface.		
13TH	25.	**Revise the syllabus. Viva-voice.**		
	26.	**Unit-V: Cooling system:**		
14TH	27.	Mould Plates its type.		
	28.	Cooling insert bolster assembly.		
15TH	29.	Types of cooling insert bolster.		Viva voce and final evaluation
	30.	**Revise the Syllabus Viva- Voice**		

LESSON PLAN

Name of Faculty: Sh. Arun Syan (Theory) & (Practical)
Discipline: Plastic Engineering
Semester: 3RD
Subject: BCE
Lesson plan Duration: 15 WEEKS

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

Week	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1ST	1	**Basics of Fluid Flow:**	1	To perform an experiment on cyclone separator
	2	Bernoulli's Rota-meter, Rate of discharge Equation and its application in fluid flow,		
	3	venturi meter, Orifice Meter, pitot-tubes		
2ND	4	velocity measurement.	2	To verify Bernoulli theorem.
	5	Reynolds's number and their use		
	6	friction losses during flow, pressure		
3RD	7	concept of manometer – simple, differential, Continuity equation	3	To determine the Reynolds number and observe the pattern of laminar and turbulent flow.
	8	**Revise Syllabus Viva-Voice**		
	9	**Heat Transfer: - Modes of heat transfer**		
4TH	10	Conduction across Single & Composite wall, Fourier law of conduction	4	To study the constructional features of reciprocating pump
	11	Convection -Heat transfer by natural & forced convection, LMTD		
	12	Individual and overall heat transfer coefficients, Heat exchanger		
5TH	13	Double pipe, Shell and Tube Heat Exchanger.	5	To determine the discharge coefficient (C_d) for a Pitot tube.
	14	**Revise Syllabus**		
	15	**Viva-Voice**		
6TH	16	**Thermodynamics**	6	To study the constructional features of reciprocating pump.
	17	total heat & specific heat		
	18	Homogenous and heterogeneous system		
7TH	19	thermodynamic equilibrium, Equation of State	7	To study the constructional features centrifugal pump.

	20	Three Laws of Thermodynamics		
	21	Isometric, Isothermal process Isobaric & Adiabatic process		
8TH	22	Concept of Gibbs free energy	8	To perform an experiment on a mixer for liquid-liquid mixing
	23	Phase change		
	24	**Revise Syllabus Viva-Voice**		
9TH	25	**Mechanical Operations**	9	To carry out the sieve analysis of a product obtained from size reduction equipment such as ball mill, grinder etc.
	26	Size Reduction law		
	27	Crusher and grinder.		
10TH	28	Its uses application.	10.	To determine overall heat transfer co-efficient in, a double pipe heat exchanger in Parallel and counter flow heat exchange modes
	29	Introduction to screening		
	30	Screening Equipment		
11TH	31	Concept of Filtration.		
	32	principle of Filtration		
	33	Introduction to Filter press		
12TH	34	Cyclones Separators		
	35	**Revise Syllabus**		
	36	**Viva-Voice**		
13TH	37	**Pumps and valves**		
	38	Construction and working of the pumps.		
	39	Reciprocating pump its principle		
14TH	40	Centrifugal pump its principle		Viva voce and final evaluation
	41	gear and screw pump		
	42	Ball valve, gate valve piston and butterfly		
15th	43	solenoid valve		
	44	**Revise Syllabus Viva-Voice**		
	45	**Class Test-III**		

Lesson Plan
Plastic Engineering

5th Semester

LESSON PLAN

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

Discipline: Plastic Engineering

Semester: 5th

Subject: PLASTIC PROCESSING TECHNIQUES-III

Lesson plan Duration: 15 WEEKS

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

Week	Working Day	Topic Covered	Practical DAY	TOPIC
1ST	1	Basic principles of operations of injections	1	To study the specifications, construction and working principle of automatic injection molding machine.
	2	Moulding machinery/types of injection moulding machines,		
	3	Piston type Injection molding		
	4	Piston-piston type Injection molding		
2ND	5	Piston-Screw type Injection molding		
	6	Reciprocating type Injection molding		
	7	Description with detailed construction.		
	8	Selection criteria for injection moulding machine		
3RD	9	Process variables	2	To study the specifications, construction and working principle of CNC injection molding machine
	10	Time, Temperature and Pressure		
	11	Mechanical control system		
	12	Electrical control system		
4TH	13	Electronic control system		
	14	Parts and functions		
	15	General specification of Injection Molding		
	16	Start-up procedure		
5TH	17	Shutdown procedure	3	Practice of Die setting and produce components on automatic / CNC injection molding machine
	18	Cylinder nozzles		
	19	Interaction of moulding variable		
	20	Time, Temperature and Pressure		

6TH	21	Optimization of cycle flow.		
	22	Optimization of cycle flow.		
	23	Defects in injection moulding products, their causes and remedies.		
	24	Defects in injection moulding products, their causes and remedies.		
7TH	25	Defects in injection moulding products, their causes and remedies.	4	To determine mould shrinkage for the component produced by Injection moulding.
	26	Loading of Mould on Injection moulding machine		
	27	Unloading of Mould on Injection moulding machine		
	28	Injection moulding of thermosets.		
8TH	29	Description with detailed construction.		
	30	Basic principles of blow moulding		
	31	Types of blow moulding		
	32	Extrusion blow moulding		
9TH	33	Injection blow moulding	5	Practice of Die setting and production of component on hand operated blow molding machine, using at least 3 moulds.
	34	Blow moulding of irregular shapes		
	35	Production of parison by extrusion		
	36	Production of parison by injection		
10TH	37	Parison wall thickness control		
	38	Parison blowing systems		
	39	Effect of process variables on product design and properties.		
	40	Parison programming		
11TH	41	Mould venting		Viva voce evaluation
	42	Defects in blow moulding products, their causes and remedies.		
	43	Defects in blow moulding products, their causes and remedies.		
	44	Defects in blow moulding products, their causes and remedies..		

12TH	45	Defects in blow moulding products, their causes and remedies.	6.	Practice of Die setting Production of components on automatic blow machine by setting the process parameters.
	46	Trouble shooting		
	47	Basic principle of rotational molding		
	48	Material selection		
13TH	49	Estimation through trial analysis		
	50	Type of machine		
	51	Process variables		
	52	Charge size, wall thickness control		
14TH	53	Heating and Cooling system	7.	To produce small components on vertical hydraulic injection moulding machine
	54	Process requirement for the moulding of water tank		
	55	Process requirement for the moulding of dust bin		
	56	Application of Rotational Moulding.		
15TH	57	Ejection and Finishing		Viva voce and final evaluation
	58	Fault - Causes and Remedies		
	59	Fault - Causes and Remedies		
	60	Merits and Demerits of Rotational Moulding Process.		

LESSON PLAN

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

Discipline: Plastic Engineering

Semester: 5th

Subject: PRWM

Lesson plan Duration: 15 WEEKS

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

Week	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1ST	1	**Unit-I : Pollution and Hazards related to Plastics** Pollution caused by plastics	1	To conduct recyclability test
	2	loading of toxic chemicals from plastics into soil		
	3	loading of toxic chemicals from plastics into water		
2ND	4	including additives, flame retardants,	2	Collection of different plastic wastes and their segregation in various groups
	5	Landfill, incineration of Plastics		
	6	ISI Standards regarding limits of these chemicals in effluents.		
3RD	7	Collection of plastic waste	3	Conversion of collected samples into plastic granules
	8	**Unit-II: Plastic waste and its Separation**		
	9	Collection of plastic waste		
4TH	10	Sources of plastic wastes,	4	Property modification of plastic granules by adding natural material like cellulose
	11	**Class Test - I**		
	12	Sorting methods such as Identification marks,		
5TH	13	Segregation methods such as Identification marks,	5	Determination of BOD and COD of given samples of effluents of plastic industry
	14	Density separation,		
	15	Solvent separation		
6TH	16	Floatation techniques	6	Mixing of virgin polymers with recycled polymers (both by melt method and solvent method)
	17	Equipment based sorting techniques.		
	18	Thermocouples		
7TH	19	Sources of plastic wastes,	7	

	20	Collection of plastic waste		To carry out plastic waste management of at least one department/section of the polytechnic
	21	**Class Test-II**		
8TH	22	**Unit-III: Polymer degradation and their life expectancy**		
	23	Natural and synthetic polymer and their compatibility with surroundings		
	24	starch and proteins, silicones and other man made fabrics.		
9TH	25	Life expectancy of different plastics in environment and thermal degradation, biodegradation and photo degradation		
	26	Agents for increasing life expectancy of polymers		
	27	**Unit-IV: Plastic Waste Management:**		
10TH	28	Public awareness regarding hazards caused by indiscriminate use of plastics		
	29	Proper disposal of plastics, Need and importance of plastic reprocessing.		
	30	**Unit-V: Plastic Waste Management Techniques**		
11TH	31	Stages in plastic recycling,		
	32	Energy recovery from plastic waste, Co-processing in cement Kiln, Plastic waste in road construction.		
	33	Advantages and disadvantages of recycling		
12TH	34	**Unit-VI: Machinery and Value addition:**		
	35	Process flow chart by mechanical route - Basic Mechanical recycling		
	36	Plant-Additives for improving quality of recycled products		
13TH	37	value addition in Plastics recycling viz.,		
	38	PP/HDPE woven sacks to Pots, PE/PE multilayer film waste to moulded products.		
	39	Mulching, canal lining, rainwater harvesting,		
14TH	40	waste water recovery by membrane separation		
	41	Revision of topic		
	42	Again, revised important topic of exam point of view		
15TH	43	Viva voice		Viva voce and final evaluation
	44	Practice for the all syllabus		
	45	**Class Test-III**		

LESSON PLAN

Name of Faculty: Sh. Pankaj Garg (Theory) & (Practical)

Discipline: Plastic Engineering

Semester: 5th

Subject: Compounding and Formulation of Plastics (CAFP)

Lesson plan Duration: 15 WEEKS

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

Week	THEORY		PRACTICAL	
	Lecture DAY	TOPIC	Practical DAY	TOPIC
1ST	1	**Unit 1: Introduction** Introduction to CAFP	1	Extraction of inorganic additives from PVC i.e. fillers, pigments etc. by dissolving
	2	Principles of compounding		
	3	for modifying and enhancing processing		
	4	Application properties		
2ND	5	Service life of plastics		PVC compound in solvents such as THF, EDC and Cyclohexanone and removing PVC and soluble organic materials
	6	**Class test –I**		
	7	**Unit –II :** Definition of additives		
	8	Classification of additives		
3RD	9	Description of following additives and their functions	2	Making a PVC compound having following ingredients (100 parts) Stabilizer (2 – 3 parts), Lubricant (0.5 – 1.0 parts);
	10	Properties Modifiers		
	11	Plasticisers		
	12	Fillers		
4TH	13	Impact modifiers		plasticizers (20 – 50 parts); Pigment (0.5 – 1 part) and Filler (10 –40 parts) on a two roll mill and compression moulding of a sheet
	14	Extenders		
	15	Processing aids		
	16	Heat stabilizers		
5TH	17	Lubricants	3	Cutting dunbell shaped test pieces for tensile strength from compression moulded sheet as prepared in (2) and
	18	Solvents and diluents		
	19	Surface property modifiers		
	20	Antistatic agents		
6TH	21	Antislip agent		finding tensile strength and elongation with or without plasticizer. Calculation of percent increase in elongation
	22	Antiblock/slip additives		
	23	Colourants		
	24	Pigments and dyes		

7TH	25	Antiageing additives	4	Analysis of the effects of fillers on mechanical properties of PVC compound
	26	Antioxidants		
	27	Anti-ozonants		
	28	UV stablisers		
8TH	29	Fungicides	5	Compounding of polyethylene with various additives, fillers, stabilizers, blowing agent and rubber
	30	Antitermites		
	31	Bactericide additives		
	32	Miscellaneous additives:		
9TH	33	Blowing agent	6	Mechanical property measurement of compounded polyethylene and evaluation of the effect of compounding variables.
	34	Flame retardants		
	35	Mould Release agents		
	36	Defoamers		
10TH	37	Smoke Suppressants		
	38	**Class Test – II**		
	39	Formulation of various ingredients in the compounding		
	40	Role of various ingredients in the compounding for both		
11TH	41	Thermoplastics materials		
	42	Thermoset materials		
	43	**Unit-III :** Compounding equipments :		
	44	Ribbon blender		
12TH	45	High speed mixer		
	46	Banbury mixer		
	47	Two roll mill		
	48	Mixer extruder (construction and working of these equipments)		
13TH	49	Ultra turax mixers		
	50	High sheer mixers		
	51	Intensive dry mixer		
	52	Compounders		
14TH	53	Twin screw extruders		
	54	Construction of Kneaders		
	55	Working of Kneaders		
	56	Dispersors		
15TH	57	**Unit – IV :** Compounding of PVC for rigid		Viva voce and final evaluation
	58	Semi-rigid		
	59	Flexible applications.		
	60	**Class Test-III**		

LESSON PLAN

Name of Faculty: Sh. Arun Syan
Discipline: Plastic Engineering
Semester: 5th
Subject: EDM
Lesson plan Duration: 15 WEEKS
Work Load (Lecture) per week: 3 PERIODS

WEEK	THEORY	
	LECTURE NOS	**TOPIC**
1ST	**1**	**UNIT-1.** Introduction to EDM
	2	Concept /Meaning and its need
	3	Qualities and functions of entrepreneur and barriers in entrepreneurship
2ND	**4**	Sole proprietorship and partnership forms of business organisations
	5	Schemes of assistance by entrepreneurial support agencies at National, State
	6	District level: NSIC, NRDC, DC:MSME, SIDBI
3RD	**7**	NABARD, Commercial Banks
	8	SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI)
	9	Science and Technology Entrepreneur Parks (STEP).
4TH	**10**	**CLASS TEST**
	11	**UNIT-2.** Market Survey and Opportunity Identification
	12	Scanning of business environment
5TH	**13**	Salient features of National and State industrial policies and resultant business opportunities
	14	Types and conduct of market survey
	15	Assessment of demand and supply in potential areas of growth
6TH	**16**	Identifying business opportunity
	17	Considerations in product selection
	18	**CLASS TEST**
7TH	**19**	**UNIT-3.** Project report Preparation
	20	Preliminary project report
	21	Detailed project report including technical, economic and market feasibility
8TH	**22**	Common errors in project report preparations
	23	Exercises on preparation of project report
	24	**UNIT-4.** Introduction to Management
9TH	**25**	Definitions and importance of management Functions of management: Importance and Process of planning, organising, staffing, directing and controlling
	26	Principles of management (Henri Fayol, F.W. Taylor)

		Concept and structure of an organisation
	27	Types of industrial organizations: Line organization, Line and staff organization, Functional Organisation
10TH	**28**	**UNIT-5:** Leadership and Motivation Leadership: Definition and Need
	29	Qualities and functions of a leader
	30	Manager Vs leader
11TH	**31**	Types of leadership
	32	Motivation: Definitions and characteristics
	33	Factors affecting motivation
12TH	**34**	Theories of motivation (Maslow, Herzberg, McGregor)
	35	**UNIT-6:** Management Scope in Different Areas Human Resource Management : Introduction and objective, Introduction to Man power planning, recruitment and selection Introduction to performance appraisal methods
	36	Material and Store Management: Introduction functions, and objectives,
13TH	**37**	ABC Analysis and EOQ
	38	Marketing and sales: Introduction, importance, and its functions
	39	Physical distribution, Introduction to promotion mix, Sales promotion
14TH	**40**	Financial Management :Introductions, importance and its functions
	41	Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT
	42	**UNIT-7:** Miscellaneous Topics Customer Relation Management (CRM), Definition and need,Types of CRM
15TH	**43**	Total Quality Management (TQM) :Statistical process control, Total employees Involvement, Just in time (JIT)
	44	Intellectual Property Right (IPR) :Introductions, definition and its importance, Infringement related to patents, copy right, trade mark
	45	**CLASS TEST**

LESSON PLAN

Name of Faculty: Ajay Kumar
Discipline: Plastic Engineering
Semester: 5th
Subject: Plastic Packaging and Printing
Lesson plan Duration: 15 WEEKS
Work Load (Lecture) per week: 3 PERIODS

WEEK	THEORY	
	LECTURE NOS	TOPIC
1ST	1	UNIT-1. Co-extrusion, its types.
	2	Extrusion-stretch Blow Moulding
	3	Extrusion-stretch Blow Moulding contd.
2ND	4	Low Density Polyethylene,
	5	High Density Polyethylene,
	6	Ultra -High Density Polyethylene,
3RD	7	Ultra High Molecular High-Density
	8	Polyethylene Applications in Packaging.
	9	Applications in Packaging of Polypropylene
4TH	10	Applications in Packaging of Polypropylene Films,
	11	Applications in Packaging of Polystyrene-Properties,
	12	Processing and Applications, PVC in Packaging,
5TH	13	CLASS TEST
	14	Processing and Applications of Nylon - 6 Films,
	15	Polyester Film, identification of Plastics,
6TH	16	Expanded Polystyrene, ,Expanded Polyethylene,
	17	Plastic Woven Sacks
	18	Polycarbonate (PC).
7TH	19	Packaging of Processed Food Products, dehydrated.
	20	Ready to use Foods,
	21	Packaging of Meat, Fish & Poultry,
8TH	22	Packaging of Fresh Foods,
	23	Packaging of Dairy Products
	24	Packaging of Biscuits,
9TH	25	Bread & Confectionery,
	26	Packaging of fruit Juices,
	27	A septic Packaging–Sterilization of Packaging Materials,

10TH	28	Using Aseptic System, Aseptic Packaging,
	29	Sterilization by Irradiation, radiation.
	30	Packaging of Horticultural Crops,
11TH	31	Packaging of Pharmaceutical products injectable.
	32	Packaging of Pharmaceutical products - Orals,
	33	Packaging of Textiles, Packaging of Fertilizers &Chemical.
12TH	34	Printing Techniques, Gravure,
	35	Printing Techniques Flexography,
	36	Inkjet Printing for coding,
13TH	37	Marking Applications, Surface Design and Sales Appeal,
	38	Graphic and Surface design.
	39	Printing Inks, Bar Coding
14TH	40	Reinforcements on Distribution Packages,
	41	Corrosion Prevention in Packaging,
	42	Principles of Corrosion and its impact on Packaging.
15TH	43	Adhesive Tapes, their Manufacture Properties & Laminations,
	44	BOPP Pressure Sensitive Tapes.
	45	CLASS TEST