B.Tech Printing and Packaging

Syllabus – June 2012

Department of New Media Technology

Makhanlal Chaturvedi Rashtriya Patrakarita Evam Sanchar Vishwavidyalaya
B-38,VikasBhawan,PressComplex,M.P.Nagar,Zone-I,Bhopal – 462011

Scheme for B.Tech (Printing & Packaging)

Semester – I

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	1B.Tech(PP)1	Engineering Chemistry	3	1	2	80	50	20	150
2	1B.Tech(PP)2	Engineering Mathematics	3	1	-	80	-	20	100
3	1B.Tech(PP)3	Communication Skills	3	1	2	80	50	20	150
4	1B.Tech(PP)4	Basic Electricals & Electronics Engg.	3	1	2	80	50	20	150
5	1B.Tech(PP)5	Engineering Graphics	3	1	2	80	50	20	150
6	1B.Tech(PP)6	Work Shop Practice	-	-	2	-	30	20	50
		Total	15	5	10	400	230	120	750

Semester – II

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	2B.Tech(PP)1	Engineering Physics	3	1	2	80	50	20	150
2	2B.Tech(PP)2	Energy, Environment, Ecology & Society	3	1	-	80	-	20	100
3	2B.Tech(PP)3	Basic Mechanical Engg	3	1	2	80	50	20	150

4	2B.Tech(PP)4	Basic Civil Engg& Engg. Mechanics	3	1	2	80	50	20	150
5	2B.Tech(PP)5	Basic Computer Engg.	3	1	2	80	50	20	150
6	2B.Tech(PP)6	Language Lab. & Seminars	-	-	2	-	30	20	50
		Total	15	5	10	400	230	120	750

L- Lecture, T-Tutorial, P-Practical Th-Theory IA-Internal Assessment

Semester – III

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	3B.Tech(PP)1	Basics of Printing Processes	3	1	2	80	50	20	150
2	3B.Tech(PP)2	Computers in Printing & Packaging	3	1	2	80	50	20	150
3	3B.Tech(PP)3	Printer Science	3	1	-	80	-	20	100
4	3B.Tech(PP)4	Graphics Designing	3	1	2	80	50	20	150
5	3B.Tech(PP)5	Elements of Packaging	3	1	-	80	-	20	100
6	3B.Tech(PP)6	Electrical Machines and Utilization	3	1	-	80	-	20	100
		Total	18	6	6	480	150	120	750

Semester – IV

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	4B.Tech(PP)1	Planning for Production	3	1	-	80	-	20	100
2	4B.Tech(PP)2	Screen Printing	3	1	2	80	50	20	150
3	4B.Tech(PP)3	Printing & Packaging Materials	3	1	-	80	-	20	100
4	4B.Tech(PP)4	Packaging Design	3	1	2	80	50	20	150
5	4B.Tech(PP)5	Technology of Sheet fed offset Printing	3	1	2	80	50	20	150
6	4B.Tech(PP)6	Digital Electronic Circuits	3	1	-	80	-	20	100
		Total	18	6	6	480	150	120	750

Semester – V

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	5B.Tech(PP)1	Technology of Flexography	3	1	2	80	50	20	150
2	5B.Tech(PP)2	Digital Pre Press	3	1	2	80	50	20	150
3	5B.Tech(PP)3	Image Carrier for Printing Process	3	1	2	80	50	20	150

4	5B.Tech(PP)4	Packaging Science	3	1	-	80	-	20	100
5	5B.Tech(PP)5	Paper & Paper Board Packaging	3	1	-	80	-	20	100
6	5B.Tech(PP)6	Multimedia Technology	3	1	-	80	-	20	100
		Total	18	6	6	480	150	120	750

Semester – VI

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	6B.Tech(PP)1	Technology of Color Separation	3	1	2	80	50	20	150
2	6B.Tech(PP)2	Technology of Gravure	3	1	2	80	50	20	150
3	6B.Tech(PP)3	Newspaper and Book Publishing	3	1	2	80	50	20	150
4	6B.Tech(PP)4	Plastic & Polymer Based Packaging	3	1	-	80	-	20	100
5	6B.Tech(PP)5	Metal Based Packaging	3	1	-	80	-	20	100
6	6B.Tech(PP)6	Wood & Glass Based Packaging	3	1	-	80	-	20	100
		Total	18	6	6	480	150	120	750

* **Industrial Training (4 Weeks during vacation)**

Semester – VII

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	7B.Tech(PP)1	Industrial Management & Plant Layout	3	1	-	80	-	20	100
2	7B.Tech(PP)2	Project Management and Entrepreneurship Development	3	1	-	80	-	20	100
3	7B.Tech(PP)3	Packaging Machineries & Processes	3	1	2	80	50	20	150
4	7B.Tech(PP)4	Machine Maintenance Management	3	1	-	80	-	20	100
5	7B.Tech(PP)5	Specialized Packaging	3	1	-	80	-	20	100
6	7B.Tech(PP)6	Technology of Web offset	3	1	2	80	50	20	150
7	7B.Tech(PP)7	Industrial Training	-	-	**2***	-	80	20	100
		Total	18	6	6	480	180	140	800

*** Industrial Training (4 Weeks during vacation) – 80 contact hours workload is expected during the training including the preparation and presentation time. 40 hours are invested in training during vacation, remaining 40 hrs – 2 hrs/week will be used for the rest of the work.**

Semester – VIII

No.	Subject Code	Subject Name	Contact Hours			Marks			
			L	T	P	Th	P	IA	Total
1	8B.Tech(PP)1	Finishing Technology	3	1	2	80	50	20	150
2	8B.Tech(PP)2	Quality Control and Supply Chain Management	3	1	-	80	-	20	100
3	8B.Tech(PP)3	Security Printing & Counter feiting	3	1	-	80	-	20	100
4	8B.Tech(PP)4	Costing & Estimating	3	1	-	80	-	20	100
5	8B.Tech(PP)5	Digital & Advance Printing Processes	3	1	2	80	50	20	150
6	8B.Tech(PP)6	Major Project	-	-	6	-	100	50	150
		Total	15	5	10	400	200	150	750

1B.Tech(PP)1 Engineering Chemistry

Maximum Marks 150

Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Water And ITS Industrial Applications :** Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (Exrernal & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods.	**12**	**4**		1	**8**	
Unit II **Fuels & Combustion :** Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numerical problems.	**12**	**4**			**8**	
Unit III **A. Lubricants :** Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods. **B. Cement & Refractories :** Manufacture , IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories .	**12**	**4**			**8**	
Unit IV **High- Polymer :**	**12**	**4**			**8**	

Introduction, types and classification of polymerization, Reaction Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMA, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Silicone Resin, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S. Flow sheet manufacturing diagram of Nylon 6:6 & Decoran. **Unit V** **A. Instrumental Techniques In Chemical Analysis :** Introduction, Principle, Instrumentation and applications of IR, NMR,UV, Visible,Gas Chromatography, Lambert's and Beer's Law **B. Water Analysis Techniques :** Alkalinity, hardness (Complexo-metric), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques.	**12**	**4**			**8**	

Reference Books:

1. Chemistry for Environmental Engineering - Sawyer, McCarty and Parkin – McGraw Hill,International.
2. Engineering Chemistry - B.K. Sharma, Krishna Publication.
3. A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand Publication.
4. Applied Chemistry - Theory and Practice, O.P. Viramani, A.K. Narula, New Age Pub.
5. Polymer Science – Ghosh, Tata McGraw Hill.

Engineering Chemistry Practical

NOTE: At least 10 of the following core experiments must be performed during the session.

1. **Water Testing**
   - (i) Determination of Total hardness by Complexometric titration method.
   - (ii) Determination of mixed alkalinity
     - (a) OH & C03
     - (b) C03 & HCO3
   - (iii) Chloride ion estimation by Argentometric method.
2. **Fuels & lubricant testing:**

(i) Flash & fire points determination by
a) Pensky Martin Apparatus,
b) Abel's Apparatus,
c) Cleveland's open cup Apparatus.
d) Calorific value by bomb calorimeter

(ii) Viscosity and Viscosity index determination by
a) Redwood viscometer No.1
b) Redwood viscometer No.2

(iii) Proximate analysis of coal
a) Moisture content
b) Ash content
c) Volatile matter content
d) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. **Alloy Analysis**

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloys by Iodometric Titration

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1B.Tech(PP)2 Engineering Mathematics

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo	Field Visit
Unit I **Differential Calculus :** Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature : Radius of curvature, centre of curvature.	**12**	**4**				
Unit II **Integral Calculus :** Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration, Area,Volume and Surfaces using double and triple Integral.	**12**	**4**				
Unit III **Differential Equations :** Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (solvable for p, x and y, Clairauts Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters	**12**	**4**				
Unit IV **Matrices :**	**12**	**4**				

Rank, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its Application to find the inverse **Unit V** Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic Graph Theory : Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network,	**12**	**4**				

References:

(i) Advance Engg. Mathematics. By Ramana, Tata McGraw hill.
(ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
(iii) Advance Engineering Mathematics by D.G.Guffy
(iv) Engineering Mathematics by S S Sastri. P.H.I.
(v) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
(vi) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India

1B.Tech(PP) 3 Communication Skills

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I - Languages and skills of communication Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sings, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.	**12**	**4**			**8**	
Unit II - Application of linguistic ability Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.	**12**	**4**			**8**	
Unit III - Letter Writing: Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.	**12**	**4**		1	**8**	
Unit IV Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speech advertising.	**12**	**4**			**8**	
Unit V Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation – Telephone media, socializing, cultural events, debates, speech.	**12**	**4**			**8**	

Communicative Language Lab.

Course objective : The language lab focuses on the production and practice of sounds of English through audio – visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome r inhibitions and self – consciousness while speaking in English.

Topics to be covered in the Language laboratory sessions :

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
2. phonetic symbols and pronunciation.
3. Listening skills (Including Listening Comprehension)3
4. Reading Skills (Including Reading Comprehension)
5. Writing Skills (Including structuring resume and cover letter)
6. Speaking Skills
7. Body Language
8. Oral Presentation : Preparation and delivery using audio – visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)

Final Assessment Should be based on Assignment, presentation and interview.

Reference Books :-

1. Business Correspondence and Report Writing - By Sharma; TMH.
2. Living English Structure – By W.S. Allen; Longmans.
3. English Grammar – Ehrlich, Schaum Series; TMH.
4. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman.
5. New International Business English – by Joans and Alexander; OUP.
6. Effective Technical Communication – Rizvi; TMH.

1B.Tech(PP) 4 Basic Electricals & Electronics Engg.

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Electrical circuit analysis-** Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation.1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.	**12**	**4**			**8**	
Unit II **Transformers-**Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.	**12**	**4**			**8**	
Unit III **Rotating Electric machines-** Constructional details of DC machine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emf equation of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor and generator.	**12**	**4**	**1**		**8**	
Unit IV **Digital Electronics-**Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flip flop.	**12**	**4**			**8**	

Unit V **ELECTRONIC COMPONENTS AND CIRCUITS-** Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.	**12**	**4**			**8**	

References:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition

List Of Experiments

1. Verificatiions of Thevenin's Superposition theorem.
2. Study of Transformer, name plate rating, determination of rayio and polarity.
3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.
4. Seperation of resistance and inductance of choke coil.
5. Measurement of various line & phase quantities for a 3-phase circuit.
6. Identification of different Electronics components.
7. Observing input and output waveforms of rectifiers.
8. Transistor application as amplifier and switch.

9. Verification of truth table for various gates.

1B.Tech(PP) 5 Engineering Graphics

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo /Pr	Field Visit
Unit I **Scales**: Representative factor, plain scales, diagonal scales, scale of chords. **Conic sections**: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent. **Special Curves**: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.	**12**	**4**			**8**	
Unit II **Projection**: Types of projection, orthographic projection, first and third angle projection, **Projection of points and lines**, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.	**12**	**4**		**1**	**8**	
Unit III **Projection of planes and solids**: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.	**12**	**4**			**8**	
Unit IV **Section of Solids:** Section of right solids by normal and inclined planes; Intersection of cylinders. **Development of Surfaces**: Parallel line and radial - line method for right solids.	**12**	**4**			**8**	
Unit V **Isometric Projections:** Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.	**12**	**4**			**8**	

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.						

References

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
2. Bhatt N.D.; Engineering Drawing, Charotar
3. Venugopal K.;Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
7. Agrawal and Agrawal; Engineering Drawing;TMH
8. Shah MB and Rana BC; Engg.drawing; Pearson Education
9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
10 Jolhe DA; Engg. Drawing an Introduction; TMH
11 Narayana K.L.; Engineering Drawing; Scitech

List of Practical:

Sketching and drawing of geometries and projections based on above syllabus

Term work: A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25%marks for Teachers Assessment

Practical Marks to be allotted based on written test and viva.

Note: To cover above syllabus, the University must have CAD software and a computer lab (6 to 12 hrs/month/student).

1B.Tech(PP)6Work Shop Practice

Maximum Marks 50
Distribution of Marks: 30 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo	Field Visit
Unit I Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop Use of various smithy tools. Forging operations:Upsetting, Drawing down, Fullering,Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs : Forging of chisel., forging of Screw Driver				**8**		
Unit II Carpentry Shop: Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing &marking of various carpentry joints. Suggested Jobs: Name Plate ,Any of the Carpentry joint like mortise or tennon joint				**8**		
Unit III Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping. Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.				**8**		

Unit IV Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns. Moulding: Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mouldusing single piece and split patterns. **Unit V** Welding: Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIGwelding processes . Safety precautions.				**8** **8**		

Reference Books:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol.1& 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.

5 Jain. R.K. Production Technology

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2B.Tech(PP)1 Engineering Physics

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo /Pr	Field Visit
Unit I **Quantum Physics:-** Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)	**12**	**4**			**8**	
Unit II **Wave Optics:-** Interference : Fresnel's biprism, Interference in thin films (due to reflected and transmitted light), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating). Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.	**12**	**4**	**1**		**8**	
Unit III **Nuclear Physics:-**Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle acceleratos: Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger- Muller Counter, Motion of charged particles in crossed electric and magnetic fields. Uses of Bainbridge and Auston mass Spectrographs.	**12**	**4**			**8**	
Unit IV	**12**	**4**			**8**	

Solid State Physics:-Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zener diode, tunnel diode, photodiode, solar-cells, Hall effect. Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses **UNIT V** **Laser and Fiber Optics:-**Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser beam. Coherence, directionality and divergence. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram.. Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number, propagation of light through step index fiber (Ray theory) pulse dispersion, attenuation, losses & various uses. Applications of lasers and optical fibers.	**12**	**4**			**8**	

Reference Books: -

1. Optics By Ghatak, TMH
2. Engineering Physics- V. S. Yadava, TMH
3. Optics by Brijlal and Subhraininyan.
4. Engineering physics by M.N. Avadhanulu and. S. Chand & Co.(2004)
5. Atomic and Nuclear physics by Brijlal and Subraminiyan.
6. Concepts of Modern Physics- Beiser, TMH
7. Solid State Physics by Kittel ,Wiley India
8. Fundamentals of Physics-Halliday, Wiley India

List of suggestive core experiments: -

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. G.M. Counter
4. Spectrometers-R.I., Wavelength, using prism and grating

5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. To study Hall effect.
11. Solar cell.
12.To find the width of s single slit by f He-Ne Laser.
13. To determine the numeral aperture (NA) of a Optical Fibre.
14. To determine plank's constant.
15. Other conceptual experiments related to theory syllabus.

2B.Tech(PP)2 Energy, Environment, Ecology & Society

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo	Field Visit
Unit –I **Energy**- Sources of Energy :- Renewable & Non Renewable, Fossil fuel, coal, oil, Gas, Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.	**12**	**4**				
Unit –II **Ecosystem –** Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation, Food Chain.	**12**	**4**				
Unit –III **Air Pollution & Sound Pollution -:**Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.	**12**	**4**		1		
Unit –IV **Water Pollution:**– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent. **Soil Pollution** – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.	**12**	**4**				

Unit –V **Society & Ethics –:**Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , Environmental Impact Assessment.	**12**	**4**				

References:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH

2B.Tech(PP)3 Basic Mechanical Engg.

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
UNIT I **Introduction to Theory of Machines** **Materials:** Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.	**12**	**4**			**8**	
UNIT II **Measurement:** Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.	**12**	**4**			**8**	1
UNIT III **Fluids**: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.	**12**	**4**			**8**	
UNIT IV **Thermodynamics:** First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and	**12**	**4**			**8**	

induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants. **UNIT V** **Reciprocating Machines:** Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines	**12**	**4**			**8**	

Reference Books:-

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engg. Wiley India
3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4. Rajput; Basic Mechanical Engg;
5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
6. Nakra and Chaudhary; Instrumentation & measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH
8. Ganesan; Combustion Engines; TMH

List of Suggestive core Experiments(Please Expand it)

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orifice meters.
4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine- bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50 Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/belt dynamometer.

9.Analysis of exhaust gases on petrol, diesel & biodiesel engines

2B.Tech(PP)4 Basic Civil Engg & Engg. Mechanics

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Building Materials & Construction** Basics of Engineering Mechanics. Building Materials & Construction - Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing. Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability	**12**	**4**			**8**	
Unit II **Surveying & Positioning** Introduction to surveying Instruments – levels, thedolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.	**12**	**4**		1	**8**	
Unit III **Mapping & Sensing** Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications. **Engineering Mechanics**	**12**	**4**			**8**	

Unit IV **Forces and Equilibrium** Graphical and Analytical Treatment of Concurrent and nonconcurrent Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems	**12**	**4**			**8**	
Unit V **Centre of Gravity and moment of Inertia** Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple	**12**	**4**			**8**	

Reference Books:

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P,Timoshenko, Mechanics of stricture, East West press Pvt.Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi n
9. Global Positioning System Principles and application- Gopi, TMH
10. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

List of suggestive core Experiments:

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cementSample.
5. To determine the workability of fresh concrete of given proportions by slump test orcompaction factor test.
6. To determine the Compressive Strength of brick .
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

2B.Tech(PP)5 Basic Computer Engg.

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
UNIT I Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, System & Application Software. Computing Ethics, Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.	**12**	**4**			**8**	
UNIT II Operating System: Definition, Function, Types, Management of File, Process & Memory. Programming Languages: Generations, Characteristics & Categorization. Introduction to Programming : Procedure Oriented Programming VS object oriented programming, , OOPS Features and Merits.	**12**	**4**		1	**8**	
UNIT III C++ : Features Character, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions, Structures & Unions, Object & Classes, Constructors & Destructors, Overloading Functions & Operators, Derived Classes and Inheritance,	**12**	**4**			**8**	
UNIT IV Data base Management System : Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.	**12**	**4**			**8**	
UNIT V Computer Networking : Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, Network Security & E-commerce.	**12**	**4**			**8**	

Recommended Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Fundamentals of Computers : V Rajaraman, PHI
3. Computer Fundamentals: Anita Goel, Pearson
4. Introduction of Computers : Peter Norton, TMH
5. Object Oriented Programming with C++ :E.Balagurusamy, TMH
6. Object Oriented Programming in C++: Rajesh K.Shukla, Wiley India
7. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.
8. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
9. Operating Systems – Silberschatz and Galvin - Wiley India
10. Computer Networks:Andrew Tananbaum, PHI

List of Experiment

1. Study and practice of Internal & External DOS commands.
2. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel,
3. Study and practice of Basic linux Commands – ls, cp, mv, rm, chmod, kill, ps etc.
4. Creation and editing of Text files using MS- word.
5. Creation and operating of spreadsheet using MS-Excel.
6. Creation and editing power-point slides using MS- power point
7. Creation and manipulation of database table using SQL in MS-Access.
8. WAP to illustrate Arithmetic expressions.
9. WAP to illustrate Arrays.
10. WAP to illustrate functions.
11. WAP to illustrate constructor & Destructor.
12. WAP to illustrate Object and classes.
13. WAP to illustrate Operator overloading.
14. WAP to illustrate Function overloading.

15. WAP to illustrate Derived classes & Inheritance.

2B.Tech(PP)6 Language Lab. & Seminars

Maximum Marks 50
Distribution of Marks: 30 Pr+ 20 IA

Course objective: This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through Language Lab.	**Lectures**	**Tutorial**	**Seminar**	**Workshop**	**Demo/Pr**	**Field Visit**
1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time and space.					**8**	
2. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.					**8**	
3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).					**8**	
4. Translation from English to Hindi and vice versa.					**8**	
5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)					**8**	

Assessment Criterion:

Oral Presentation 20
& Assignment

Viva Voice	30

3B.Tech(PP) 1 Basics of Printing Processes

Maximum Marks:-150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Brief introduction on history of Printing, Sequential developments in Printing, Printing in India, Recent trends in printing.	**12**	**4**			**8**	
Unit II Introduction to printing process: Traditional printing processes, letterpress, lithography, flexo, gravure, screen printing. and digital printing . Identification of different printed products- Job suitability of various printing processes. Advantages and disadvantages of various printing processes.	**12**	**4**	**1**		**8**	
Unit III Letterpress process of printing: Introduction, characteristics of letterpress printing, tools & equipments used in the Letterpress department, classification of letterpress printing machines, Inks & image carriers. Lithographic printing process: Introduction, characteristics of lithographic printing, classification of offset printing machines Different units of offset machine, plates, inks & Substrates.	**12**	**4**			**8**	
Unit IV Flexography printing process: Introduction, characteristics of flexography, components of flexo press, flexo plates, introduction to flexo inks & substrates. Gravure printing process: Introduction, characteristics of gravure, principles of gravure printing, basic components of gravure press, gravure inks & substrate.	**12**	**4**			**8**	

Unit V Screen printing process: Introduction, application of screen printing, tools, equipments & accessories used in screen printing, screen printing process steps, Digital printing Process: Introduction, various digital printing technologies.	**12**	**4**			**8**	

Text and Reference books:

1. Letter Press Printing Part 1, 2 - C.S. Misra
2. Printing Technology -Adams, Faux, Rieber
3. Screen Printing Review -Babett Magee
4. Screen Printing - John Stephens
5. Screen Printing -B.D Mendhiratta , Arihant Publications
6. Handbook of Print media: Technologies and production methods -Helmnt Kipphan

Minimum topics to be covered in laboratory sessions:

1. Identification of different tools & equipments used in various printing process.
2. Introduction of different printing presses.
3. Schematic diagram of different printing processes.
4. Study of running & printing faults on different printing process machine.
5. Study of various types of Image carriers for different printing process.
6. Overview for multi colour printing.

3B.Tech(PP) 2 Computers in Printing & Packaging

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 P + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Personal Computers- Labeling standards : Software applications, utilities, operating systems. Linking hardware and software, device interfaces, BIOS, device drivers. Memory- Introduction, types, Cache memory, Magnetic tape, optical disk, CCD, MBM (Magnetic Bubble Memory).	**12**	**4**			**8**	
Unit II Mass storage technology- data organization, HD,SCSI, their storage capacity, compact disc. recent developments in display devices- Content management system & introduction to calibrations. Interactive display devices- keyboard, mouse, scanners, printers (1st gen printers, ink jet, laser), plotters digital pens, Introduction to computer terminologies used in printing & packaging	**12**	**4**		1	**8**	
Unit III Use and importance of computers in printing- Introduction to DTP, DTP in printing technology, Software and Hardware requirements, Use of Page Maker, QuarkXpress, CorelDraw, Photoshop and Indesign. Page Designing, Newspaper Page Layouts, DTP in Advertisements, Books and Magazines, Page Orientations, Columns and Gutters, Master Pages, Printer Setup.	**12**	**4**			**8**	
Unit IV						

Story editing, formatting and Working with graphic tools, importing graphic, working with color, table editing. Desktop publishing in Macintosh and other PCs , Cost estimation of DTP. Digital image (BMP, TIFF, GIF) file formats. Image compression & its types emorphony distortion.	**12**	**4**			**8**	
Unit V Usage of Computers-Application of computer in printing and publishing Pre Press-_DTP Packages, CTF,CTP,CTM ,S/W applications, file format, Press - CPC, Post -Press-Quality Control , Management-cost estimation, production planning, jobsheet, procurement	**12**	**4**			**8**	

Text and Reference books:

1. Hardware Bible - Winn IL Roch Techmedia
2. Desk Top Typography - Quark XPress
3. Page Maker 6.0 - BPB Publication.
4. DTP by Vikas Gupta Published -Dreamtech Press New Delhi
5. Handbook of Print media: Technologies and production methods -Helmnt Kipphan
6. A Guide to graphic print production - Kaj Johansson,Wiley Publications.

Minimum Topics to be covered in laboratory sessions:

1. Use of different Hardware devices.
2. Practice of Word-Processing Software.
3. Study of DTP and its features, Software's used in printing & Packaging.
4. Page set-up with different sizes and margins.
5. Practice of image Capturing Devices (scanners..)
6. Image and Text merging.
7. Modifications and Editing of illustrations and Text

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3 B.Tech(PP) 3 Printer Science

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I pH and Printing- Definition of pH, Method of determining pH, Importance of pH in Printing & Packaging, pH of paper & ink, Relative Humidity in Printing and Packaging **:** Humidity – Definition, Relative Humidity Measurement, Control by air conditioning , role and effect of Relative Humidity in Printing & Packaging	**12**	**4**				
Unit II Optics & Optical Instruments **:** Reflection, Transmission, Opacity, Density, Viewing Angle, Magnification, Magnifying Glass, Simple Microscope, safe Light Condition, Introduction to Photographic Cameras and Contact printer, Introduction to Densitometer ,Spectrophotometer and its types. Chemistry of Photography & Light Sensitive Materials : Introduction to photo-chemistry, Light Sensitive Materials, Types, Constituents and properties of LSM.	**12**	**4**	**1**			
Unit III Surface Chemistry **:** Surface tension, Contact angles, Capillary Action, Interfacial Tension, Hydrophobic & Hydrophilic, Water and Ink Interaction, Emulsification .	**12**	**4**				

Effect of light and temperature in printing and packaging: Effect of light and temperature on different film and plate coatings, Adhesives & Ink-films, Light fastness, Print characteristics, effect of light on different poly films /substrates.	**12**	**4**				
Unit IV Polymers: Monomer, Polymer, Types of Plastics- Thermo-sets & Thermoplastics. Introduction to Natural Polymers, Cellulose Derivatives, Synthetic Polymers, Polythene, Polypropylene, Polyvinyl Plastics.						
Unit V Understanding Colour**:** Fundamental of Colours, Light, Source of Colour, Primary Colours, Secondary Colours, Absorption, Selective Absorption, Additive Colours, Subtractive Colour, Spectral Transmission Curves. Introduction to Colour Measurement.	**12**	**4**				

Text and Reference books:

1. Printing Science: By L C Young, F.Pateman
2. Optics by Ajay Ghatak
3. Engineering Chemistry by Jain and Jain

3B.Tech(PP) 4 Graphics Designing

Maximum Marks 150
Distribution of Marks: 80 Th.+ 50 pr + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Introduction to "Graphic Design" **:** Definition, Graphic design, Printer's design.. Fundamentals of Design **:** Line, tone, value, hue, weight, texture, shape, size, etc. Principles of design- balances, proportion, rhythm, unity, contrast, simplicity, fitness.	**12**	**4**			**8**	
Unit II Colour theory: dimension of colour, colour, psychology ,colour wheel , colour schemes, colour symbolism, emotional effects of colour. Classification of typefaces & Methods of type arrangement,	**12**	**4**			**8**	
Unit III Layout Planning **:** rough layout, comprehensive, artwork, type of originals, sizing, masking and cropping, perspective, Scale. Design management **:** Definitions in advertising art, modern art, abstract art, applied art, publicity, public relations, role of design in sale promotion.	**12**	**4**		**1**	**8**	

Unit IV Graphics Design in Publications**:** Various software's & tools used for designing-HTML XHTML,CSS,DTD, epubs Illustrator , coreldraw, Indesign, Photoshop, freehand.	**12**	**4**	**1**		**8**	
Unit V House style, Good and bad copy, proofing stages, concept of impositions and method of costing off.	**12**	**4**			**8**	

Text and Reference books:

1. The Designer's Handbook -Alistair Campbell.
2. Art and Print Production - N.N Sarkar.

Minimum topics to be covered in laboratory sessions:

1. Designing of Stationary and small sales literature, visiting card. Letterhead, Envelop, Bill form, Receipt, Invitation card, Posters, Title page of a Book, Magazine Cover page.
2. Direct mail.
3. Folders - Single fold & Double fold.
4. Sticker and Labels.
6. Logo designing on computers.
7. Colour mixing and colour matching.
8. Tagging ,creating flow able and fix format, epubs

3B.Tech(PP) 5 Elements of Packaging

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I History and evolution of packaging. Basics of Packaging : Introduction, Classification, Functions & roles, Factors influencing design of a Package.	**12**	**4**				
Unit II Packaging Cycle, Product-Package Relationship, Product life cycle curve, Elements of package design, types of Packaging- Flexible , Rigid & semi-rigid .	**12**	**4**				
Unit III Markings on package – Handling marks, routing marks, information marks. Cushioning materials – Functions and properties, Classification- space fillers, resilient cushioning and, non-resilient cushioning materials.	**12**	**4**				1
Unit IV Introduction to Packaging Media and their characteristics paper, board, foils poly plastics, glass, wood, metals ,etc .	**12**	**4**				
Unit V						

Introduction to innovative Packaging-: Gas packaging – MAP & CAP, Vacuum packaging, shrink packaging, Stretch wrapping, blister packaging, skin packaging, Aerosol packaging container.	**12**	**4**				

Text and Reference books:

1. Packaging design and performance – Frank Paine
2. Advances in plastic packaging technology – John Briston

3B.Tech(PP) 6 Electrical Machines and Utilization .

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I D.C. Generator : Construction; types, series, shunt, compound E.M.F. equation, Building up of E.M.F. in shunt generator, Significance of residual magnetism, Generation characteristics. D.C. Motor : types, Principles of operation, Significance of back e.m.f., Torque equation. Torque-speed characteristics of series, Shunt and compound motors, speed control of d.c. motors by armature resistance, Flux control and thyristor control method Applications.	**12**	**4**				
Unit II. Single Phase Motors **:** Types, single phase induction motor Principle of operation of induction-motor, Repulsion motor, A.C. series Motor, Application. Measurement of power in Three phase circuit by three wattmeter method, Two Wattmeter method, Single wattmeter method	**12**	**4**		**1**		
Unit III . Three Phase Induction Motor : Basic principle of operation, cause of rotating rotor, slip frequency of rotor current, Relation Between torque and rotor power factor, starting Torque for squirrel cage induction motor, Starting torque for slip ring induction Motor, Condition for maximum torque, Effect of rotor resistance on torque, torque-slip characteristic, Different type of starters.	**12**	**4**				
Unit IV						

Electrolytic Processes **:** Introduction, Electrolyted, ionization, Definition of various terms used in electrolysis, Faraday's laws Of electrolysis, Extraction of metals, Refining of metals, electro deposition, power supply for electrolytic processes. **Unit V** Consideration and selection of electric motor for different industrial drives. Electric Welding **:** Principle, Resistance welding, Arc welding, Atomic hydrogen, A.C. & D.C. welding, welding transformer, Electric-heating : Introduction, Resistance heating, Direct resistance. Industrial Electrical Installations	**12** **12**	**4** **4**				

Text and Reference books:

1. Elements of Electrical Engg - L. **Theraja, Vol. 1, 2**

4B.Tech(PP) 1 Planning for Production .

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Classification of Print Products for Commercial Printing and Package-** Commercial Printing- Books, magazines, stationary, newspaper, utility(bills, variable data printing(VDP), customized) printing, advertising materials like lenticular printing (3D), Pam plates ,posters, danglers, calendar,etc Package printing- Folding boxes, cartons, label , flexible packing ,tin, wood, glass.	**12**	**4**				
Unit II **Designing of Print Products for Commercial Printing and Package -** design considerations & principle for books & magazines ,newspapers stationary & advertising products. Design considerations including legal aspects & principles for flexible, rigid and label packing.	**12**	**4**				1
Unit III **Selection of Printing Processes for deferent products-** Selection criteria for books & magazines - offset ,digital, gravure, wed offset, sheet offset, digital. Stationary-screen and offset, advertising products- digital and offset, Selection criteria for flexible, (flexo & gravure), rigid (offset & flexo) and label (offset & flexo) packing.	**12**	**4**				
Unit IV **Selection of Substrates and others materials** for newspaper, books, magazines**,** Newspaper, books, magazines stationary & advertising products.	**12**	**4**				

Unit V **Selection of Binding, Finishing & Converting Products,** process, study of machines utilized process. Books & magazines- Folding, gathering(stitching, sewing & perfect), securing, covering (soft cover, hard cover),centre stitch & finishing(packaging & shipping). Newspaper- folding, gathering, bundling. Packaging-Rigid-inline die cutting, creasing & embossing, Stitching. Flexible- Filling, scaling/weighing, sealing ,making label- cutting, gluing, die cutting.	**12**	**4**				

Text and Reference books:

1. Fundamentals of Copy & Layout -A.C. Book(Ac)Sohick(Cd)
2. Production for the Graphic Designer- Craig
3. How to brief designs & buy print- Murray (Ray)
4. Lithographic press work – A.S.Porter.

4B.Tech(PP) 2 Screen Printing

Maximum Marks 150
Distribution of Marks: 80 Th+50pr. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Introduction** History of screen Printing, Development of Screen Printing, Screen Printing Scenario in India, Screen Printing and Its Applications, Advantage of Screen Printing.	**12**	**4**			8	
Unit II **Screen Printing Equipment and Accessories** Printing Table, Screen Frame, Squeegee, C&G Clamps, Level Adjuster, Push pin Hinges, Drying Racks /Dryers, emulsion/Sensitizer, Other Accessories, Preparation of Screen Frame, Degreasing, Emulsion Coating, Drying the Coated Screen, Exposing the Screen, Developing Exposed Screen, Developing Exposed Screen, Types of Stencils.	**12**	**4**			8	1
Unit III **Preparation for Printing** Registration, Feeding of the Stock, Actual Printing, Multi Colour Screen Printing, Halftone Screen Printing, Stickers(Transfers), Cleaning Operation.	**12**	**4**			8	
Unit IV **Different Types of Inks & Solvents and Printing on Various Surfaces** Characteristics of screen printing inks, various Types of screen Printing Inks, Colour Mixing and matching, Printing on paper and card, Articles with Thick Surfaces, Printing on metal and Metal Foils, The Textile Printing,	**12**	**4**			8	

printing on Vertical Surfaces, Printing on Shaped Objects, Ceramic And glass Printing, Printing on Plastic. **Unit V** **Estimating Printing Cost** Various Factors Considered for Estimation, Sample Estimation **Screen Printing Machines:-** Their Kinds and working principles and methods. Drying Equipments Drying Racks Wicket Dryers Jet Dryers Infrared Dryers Ultraviolet Dryers Flocking process. **Screen Printing Substrates:-** Introduction to Paper and Paper board Textiles Plastics. Metals Ceramics and glass .Specialized Areas -Printed circuit boards .	**12**	**4**			8	

Text and Reference books

1. Screen Printing (Graphic Communications), Sam Hoff
2. Simple Screen printing: Basic Techniques & Creative Projects, Annie Stromquist
3. Screen Printing Today: The Basics , Andy MacDougall

Minimum topics to be covered in laboratory sessions:

1. Study and fixing of various types of bolting clothe.
2. Make ready for Screen Printing – Printing of Letterheads and Visiting Cards.
3. Two colour screen Printing.
4. Printing on Paper, Plastics and shaped surface.
5. Preparation of Screen Line and Column.
6. Screen printing on paper.
7. Screen Printing on Plastics.

8. Screen Printing on Shaped Surface. 

4B.Tech(PP) 3 Printing & Packaging Materials .

Maximum Marks 100

Distribution of Marks: 80 Th + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Metals for Plate-making, Printing & Packaging :** Type of metals and its characteristics physical and Chemical properties of metals used in printing & packaging **Photographic Materials:** Construction coating **,** Protective Coating, Paper positive materials, Light sensitive materials for printing image carrier(plates, film, paper master,etc.)for major printing processes ,process chemicals:(Developers, Reducers, fixer, stopper , Intensifiers.)	**12**	**4**		1		
Unit II Paper and Non-Paper Substrate for Printing & Packaging: Types of Plastic Substrate – Polyethylene, Polypropylene, Polyvinyl Chloride (PVC), Polyethylene tera-phthalate (PET), Polyester, Polystyrene, Cellophane, Metal, Foils, Laminates.	**12**	**4**				
Unit III Printing Inks for Printing & Packaging Applications: Ingredients used in Printing and uv Inks and coating(UV aquees varnish) , Colorant – Dyes, Pigment, Vehicles, Additives, Binders, Types of						

printing Inks – Paste Inks, Liquid Inks, Letter Press Inks, Offset/ Lithographic Inks, Gravure Inks, Flexo-graphic Inks. screening inks and digital printing inks. Cushioning materials, Solid vs loose fill, Foam-in-place, Cushion curves and design, corrugated as a cushioning material, **Unit IV** **Natural and Animal Materials** - Natural- rubber, gum, arabic, starch based. Animal & fish glue. Adhesives for Printing & Packaging: Adhesion, Types of Adhesive – Natural- Animal Glues, Fish Glues, Casein Adhesives, Starch Based Adhesives, Natural resin Adhesives, Cellulose Adhesives, Rubber Based adhesives. **Unit V** **Synthetic, PUR, Hot melt, Inorganic-** Synthetic resin adhesives, Inorganic Adhesives, Hot Melt. Miscellaneous Materials : Different types of rubber used in printing, Book binding Materials – Leather, Cloth, Rexene, Threads, Tapes, Stitching Wire, Covering Materials, Laminates.	**12** **12** **12**	**4** **4** **4**				

Text and Reference books:

1. Fundamentals of Packaging Technology-FOURTH EDITION , Walter Soroka, CPP
2. Packaging Technology: Fundamentals, Materials and Processes , Anne Emblem, Henry Emblem
3. Printing Technology (Design Concepts) , J. Michael Adams , Penny Ann Dolin

4B.Tech(PP) 4 Packaging Design

Maximum Marks 150
Distribution of Marks: 80 Th+50pr. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Basics of Packaging:** Introduction, Function of a package, Factors influencing design of a package, Computer Aided Package Design, Packaging Cycle, Product Package Relationship , Product life curve, Elements of Package Design. Classification of Packaging- Flexible package type, Rigid package types. Hazards on package – Mechanical, Climatic, Biological and other hazards. Markings on package – Handling marks, routing marks, information marks. Tests on package- Mechanical test- Drop test, Vibration test, Compression test, Inclined impact test, Rolling test, Climatic tests- Rain test, Sand and dust test, Salt spray test, Fungus resistance test. Shelf life. **Unit II** **Packaging Media:**	**12**	**4**			**8**	

Application, Properties, types, Advantage & disadvantage of paper, paper board, Glass, Metal, Wood & Plastic (BOPP, HDPE, LDPE, LLDPE, PVC, PP, PET, Polyolefin, Cellulosic).	**12**	**4**		1	**8**	
Unit III **Carton Production:** Folding cartons-its Production steps, types. Corrugated containers-classifications, components in a corrugated board, flutes and stages in preparation in corrugated boards. Plastic corrugated containers - features & advantages.	**12**	**4**			**8**	
Unit IV **Plastic Packaging Techniques/Processes:** Gas packaging- MAP & CAP, Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, strip packaging, Aerosol packaging container, working principle. Injection Blow Molding, Extrusion blows molding, Extrusion. Injection Molding. Compression molding, Thermo forming. Vacuum forming, Pressure forming, and Matched mould forming.	**12**	**4**			**8**	
Unit V **Future Trends of Innovative Packaging:** Futuristic trends in packaging. Advancements in food packaging. Environmental implications of packaging- recycling, Legal aspects in Packaging. Designing-Cans, metal tubes, Plastic tubes. Closures-screw caps, Snap-on caps, Plug Closures, Lids, Threaded closures, Crowns. Adhesive tapes-Fabric tapes, Paper tapes, Film tapes, Foil tapes, Foam tapes, two faced tapes. Labels- Basic elements of correct labeling, Purpose, Types. Ancillary Materials : Sealing tapes Strapping and stapling, labels and labeling.	**12**	**4**			**8**	

Text and Reference books:

1. Packaging design and performance- Frank Paine
2. Advances in plastic packaging technology- John Briston.

Minimum topics to be covered in laboratory sessions:

1. Designing and preparation of various flexible packages.
2. Designing and preparation of various rigid packages.
3. Preparation of Jigged die & unit die for a package design.
4. Study and operation of various packaging machines.
5. Manufacturing of various types of corrugated boards.
6. Cutting, creasing and building up corrugated containers.
7. Designing & preparation of various kinds of paper bags.
8. Testing of raw materials like wood, paper, plastic.
9. Test conducted on Cartons, Corrugated packages, wooden packages, Drop test, Vibration test, inclined impact test, Compression test, Rolling test, Drum test.

4B.Tech(PP) 5 Technology of Sheet fed offset Printing

Maximum Marks 150
Distribution of Marks: 80 Th+50pr. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I History of offset printing. Recent trends in offset press technology. Basic principles of sheet fed offset printing. Construction and categories of sheet fed offset press. Safe handling of tools, equipment and materials in offset press.	**12**	**4**			**8**	
Unit II Feeding unit: Functions of the feeding section, sheet feeding types, feeding cycle, components of feeder, sheet conveying mechanisms, sheet detectors, sheet register, front lay and side lay, sheet insertion systems, grippers. Inking unit: role and function of inking system, different parts of inking system, split duct techniques, types of rollers in the inking system, setting of the rollers, care and maintenance of rollers, different inking systems.	**12**	**4**	1		**8**	
Unit III Dampening system: role and function of the dampening system, fountain solution, pH and conductivity of the fountain solutions, role of water in fountain solution, role of alcohol or alcohol substitutes in fountain solution, different rollers in the dampening system, roller coverings, doctor dwell, desensitizing the metal rollers, different dampening systems, care and maintenance of the dampening system.	**12**	**4**			**8**	
Unit IV						

Printing unit; different cylinders and their construction, cylinder gears, cylinder gap, bearers, undercut, cylinder packing, patching, printing pressures, cylinder setting theories, cylinder balancing. Pre-make ready and make ready.	**12**	**4**			**8**	
Unit V Delivery section: role and function of delivery section, transfer cylinder, sheet transfer, sheet delivery, short and extended delivery systems, sheet control devices, anti set off spray powder unit. Machine production. Trouble shooting. Printing machine maintenance	**12**	**4**			**8**	

Text and Reference books:

1. Heidelberg DI Press- Manual
2. Chemistry for Graphic Arts- Dr. Nelson R. Eldred.
3. Offset Plate Making- Robert F. Reed.
4. Printing Technology 3rd Edition- Adams, Fax & Rieder.
5. Screen Process Printing- John Stephens.
6. Sheet fed offset Press Operating- Lloyd P.Dejidas.
7. Flexography premier- Donna C. Mulvihill.
8. Stripping- Harold L.Peck.
9. Selecting the Right Litho Plate- BPIF.
10. Offset M/c II- C.S.Mishra
11. Manual for Lithography

Minimum topics to be covered in laboratory sessions

1. Study of various controls and operations.
2. Study of various mechanisms.
3. Study of the lubrication system.
4. Setting the feeder, feed board, lays and delivery.
5. Setting the water and ink rollers and fixing the plate.
6. Single color printing.

7. Two color printing.
8. Four color printing .

4B.Tech(PP) 6 Digital Electronic Circuits
Maximum Marks 100
Distribution of Marks: 80 Th + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Fundamentals of Digital Techniques , Logic Gates and Boolean algebra: Digital signals ,Review of logic gates , Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCH, Error detection and correction codes. Combinational Logic Circuits: Simplification of Boolean expression and realization using logic gates, sum of products and product of sums, Karnaugh map & variable, minimization of Boolean expressions using Karnaugh map, don't care conditions, variable entered mapping, and minimization using variable entered maps.	**12**	**4**				
Unit II **Numbering Systems & Binary Arithmetic:** Introduction. Symbolic number systems, Positional number system, Integer Binary number- Binary digital computers, Binary number system, Conversion between decimal and binary numbers, Hexadecimal numbers, Conversion between Hexadecimal, Binary & Decimal numbers. Fractional binary numbers- Converting binary fractions to decimal, Converting Hexadecimal fractions to decimal, Converting decimal fractions to Binary and Hexadecimal. Number System Notation. Binary Addition and Subtraction- Signed binary numbers, Complementary numbers, Two's complement mathematics. Binary multiplication & division. Binary codes- Character codes, Numeric codes, other binary codes, Error correction & detection codes.	**12**	**4**				1
Unit III Arithmetic Circuits: EXOR and EXNOR gates, half adder, full adder, full subtractor, adder-subtractor, look ahead and carry.	**12**	**4**				

Data Processing Circuits: Multiplexers, de-multiplexers, decoders, BCD to decimal decoder, seven segment decoder, encoders, decimal to BCD encoder, parity generators and checkers. **Unit IV** **Flip-Flops:** AND gate latch, NOR gate latch, Review of flip-flops and their conversions. Sequential Logic Circuits: Comparison between combinational and sequential logic circuits, shift registers, SISO,SIPO, PISO and PIPO shift registers, D/A & A/D Converters **Unit V** **D/A and A/D Converters:** Variable-Resistor network, binary ladder. D/A counter**.** D/A accuracy and resolution, A/D counters- simultaneous conversion, counter method, continuous conversion, successive approximation method, single slope and dual slope A/D counters**.** Programmable logic devices: ROM, PLA, PAL, FPGA AND CPLDs. Application of digital electronic in printing & packaging.	**12** **12**	**4** **4**				

Teet and Reference books:

1. Digital Electronics- Melvin.
2. Digital Electronics- Goth man.
3. Digital Principles and Applications – Donald P Leach, Albert Paul Melvin.
4. Digital Systems-Principles and Applications- Ronald J.Tocci.
5. Digital Fundamentals- Floyd.
6. An Engineering approach to digital design- Fletcher.

5B.Tech(PP) 1 Technology of Flexography.

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Introduction to Flexography: Definition Scope & Principle of flexographic printing, Advantages of flexography, Press development. Mechanics of flexography - Fountain roll, Anilox roll, Doctor blade, plate cylinder, impression cylinde. Flexographic printing plates: Introduction, Rubber plates, Photopolymer plates its kind , method, preparation , care handling and storage .	**12**	**4**			**8**	
Unit II Flexo press types - Stack press, Central impression cylinder press. Inline press, Tension control mechanism. Unwind equipments - general, single-position , flying-splice unwind tension systems.	**12**	**4**		**1**	**8**	
Unit III Rewind equipments - surface winders, center winders, rewind tension systems. Web guides. Printing stations - two roll, Deck control, Continuous inking, side and circumferential register control, Dryers. Anilox roll - construction, cell structure, anilox roll wear, selecting the right anilox roll, chrome plating. Fountain rolls - formulating rubber for rolls, Flexo roller covering, Care of covered rolls.	**12**	**4**			**8**	
Unit IV Mounting and Proofing: Introduction, Checking the equipment. Operation and care of equipment. Understanding the mounting instructions. Tools for the operator. Basic requirements for process colour printing. Press room practices. Environment and safety concerns. Flexography and Barcoding: Barcode structures. Types. Verifying/Analyzing printed barcodes.	**12**	**4**			**8**	
Unit V UPC and flexographic printing. UDC film masters and printing capability tests. The shipping container symbol (SCS). SCS shipping contain Barcode printing. Beyond the Horizon- Future of Flexography: Flexo graphic	**12**	**4**			**8**	

substrates. Narrow web presses-Narrow web press components, Future narrow web flexography. Wide web presses. Corrugated presses. Pre printed liner presses. Future of Ink distribution system. Future of flexographic plates. News print for water-base flexography.						

Text and Reference books:

1. Flexogarphy Principles and Practices -Foundation of flexography technical association
2. Handbook On Printing Technology (Offset, Gravure, Flexo, Screen) 2nd Edition, Niir Board

Minimum topics to be covered in laboratory sessions:

1. Introduction and familiarizing flexo machine and other related elements.
2. Preparation of rubber plates.
3. Study and Preparation of liquid & sheet polymer plates.
4. Registering and plate mounting on flexo plate cylinder.
5. Studt of make ready procedures for a flexo machine.
6. Printing single color, two color, four color.
7. Studying of 6 color and 8 color flexo machines.
8. Printing on various substrates LDPE, HPDE, Paper, Aluminium foil.

5B.Tech(PP) 2 Digital Pre-Press

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr.	Field Visit
Unit I Electronic input devices - OCR, Scanner, Digital Back ,Digital camera , Digital pen. Its principles, types, components. Types of scanning, advanced scanning techniques and input methods.	**12**	**4**			**8**	
Unit II Interactive and software packages, digital representation and manipulation of text and images, advanced data (text and image) editing software's.	**12**	**4**			**8**	
Unit III Electronics impositions techniques and software's for different binding schemes-Center stitching, side stitching.	**12**	**4**			**8**	
Unit IV Technological Transformation from CTF. CTP: components, principles, features and recent advancements.	**12**	**4**		1	**8**	
Unit V						

CTM: components, principles, features and recent advancements and study of different CTM machine. Different types of Lasers used in imaging for, CTP, CTM and its calibrations.	**12**	**4**			**8**	

Text and Reference books:

1. Digital Prepress Primer, Joseph Marin
2. Handbook of Print Media , Helmut Kipphan
3. Pocket Guide to Digital Prepress, Frank Romano
4. Exploring Digital PrePress: The Art and Technology of Preparing Electronic Files for Printing, Reid Anderson
5. On Demand Printing –Howard M. Fen ten ,FrankJ.Romano

Minimum Topics to be covered in laboratory sessions: Digital Pre-Press Lab

1. Study of image manipulating.
2. Study of components and working of CTP.
3. Study of components and working of CTM.
4. Study of advantages and features of Advanced CTM.
5. Study of Electronic imposition techniques (s/w)
6. Study of online & offline models.
7. Inspection of digital plates.

5B.Tech(PP) 3 Image Carrier for Printing Processes

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit: I Introduction to Film Image elements and image Assembly of films - Diffusion Transfer Materials. Assembly and masking. Basic Steps in Planning a Film and plate Image Assembly. Image assembly for single colour printing and multi colour printing-Imposition consideration.	**12**	**4**			**8**	
Unit II Sources for Image Generation – Introduction to tools & equipments used in Preparation of Image carrier for Major printing Processes. Introduction to light sources for Plate-making department for various printing processes, Source for CTP and CTM.	**12**	**4**	1		**8**	
Unit: III Image carrier for Offset – Introduction, Types of Plates – Conventional Plates, New Era Plates, Basic steps in preparation of Conventional Plates –Surface Plates and Deep Etch Plates, General processing Sequence for a Positive and Negative Working Plates, General processing Sequence for a New Era Plates – Diazo Plates, PS, Photo polymer, Photo Cross Linking Plates, CTP Plates . Working with CTP Plates, Introduction of Multi-metal plates, Paper/ Film Based Plates. Image generation for Offset DI Presses. Image Carrier for Gravure – Types of Gravure Cylinder – Mandrel, Integrated shaft, Gravure Image Cylinder Manufacturing – Thin layer Method, Ballard Skin Method, Thick layer Method. Consideration for Image Cylinder Preparation. Gravure Cylinder Imaging Diffusion Etch, Direct transfer, Electro-	**12**	**4**			**8**	

mechanical process, Laser Cutting Process. Introduction to Gravure Wells and their types. Copper Plating & Polishing, Reuse of Cylinder. **Unit: IV** Image Carrier for Flexography – Introduction, Types of Flexography Plates – Rubber and Solid Photo Polymer Plates, Liquid Photo Polymer Plates, their Advantage and Limitations, Base materials for Photopolymer Plates. Plate making process for Rubber Plates, Liquid Photo Polymer Plates, Solid Photo Polymer Plates. Computer to Plate Technology. **Unit: V** Image Carrier for Screen printing Processes: - Driography, Dry-offset, Toray Waterless Plates, and Silicon Plates for Dry offset Printing / Water Less Printing, Image carrier for Screen printing. Quality Control in Image Carrier Department: - Introduction to Quality Control Aids, tools and Equipments.	**12** **12**	**4** **4**			**8** **8**	

Text and Reference books:

1 The Complete Book On Printing Technology, Niir Board

2 Handbook On Printing Technology (Offset, Gravure, Flexo, Screen) 2nd Edition,

Minimum topics to be covered in laboratory sessions:

5B.Tech(PP) 4 Packaging Science

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit :I Colloids :Characteristics, Proportion, application in Printing Industry.Theory of Electrodeposition, Printing equipments, factors affecting nature of Electrodeposit, chromium Plating, Anodising of metal.	**12**	**4**				
Unit :II Introduction to Organic compounds, Carbon compound, Aromatic compound Diazo compound, Organic Solvents with specific name used in printing Science mainly. Introduction of Photo chemistry ,	**12**	**4**		1		
Unit :III Humidity - Relative humidity, measurement, control by air conditioning. Surface charactricts in printing - Surface tension, contact angles, capillary action, interfacial tension, measurement of contact angle, Hydropholric and hydrophillic, surface water and ink interaction.	**12**	**4**				
Unit IV Definitions of luminous flux, luminous intensity, illumination power, intensity of illumination of a surface, brightness or luminance of a surface, laws of illumination - inverse square law and lambert's cosine law, types of photometers, photovoltaic photometer.	**12**	**4**				
Unit V Durability, opacity , strength, crush, shelf life, sustainability, food grade, characteristics and their testing.	**12**	**4**				

Text and Reference books:

1. Package Design Workbook: The Art and Science of Successful Packaging, Steven DuPuis, John Silva
2. Optics -BrijLal and Subrahmaniam
3. Optics -Ajay Ghatak
4. Engineering Chemistry -Jain and Jain

5B.Tech(PP) 5 Paper & Paper Board Packaging

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit: I Paper and Paperboard Manufacturing process, Paper and board Coating, Appearance properties: Colour, Surface smoothness, surface structure, gloss, opacity, printability and varnish ability, Surface strength, Ink and varnish absorption and drying,	**12**	**4**				
Unit II Paper and Paper board: Surface pH, Surface tension, Rub resistance. Performance Properties: Basis Weight, Thickness, Moisture Content, Tensile strength, Stretch or elongation, Tear Strength, Burst strength, Stiffness, Compression strength, Crush strength, Creasability and fold ability, Ply bond strength, Flatness and dimensional stability, Porosity, Water absorbency, Gluability/Sealing, Taint and odour neutrality,	**12**	**4**		1		
Unit: III Paper and Paper Board – TYPES: Paper - Tissues, Greaseproof, Glassine, Vegetable Parchment, and Label paper, Bag Papers, sack craft, Impregnated Papers, Laminating papers. Paperboard – Folding box board, white lined chipboard, solid bleached board, solid unbleached board, Liquid packaging board, Container boards, Specialty boards	**12**	**4**				

Unit: IV Conversion Process: Flexible packaging manufacturing; Paper bags – types, manufacture, Composite cans –manufacturing, applications; Fibre drums. Multiwall paper sacks - types, manufacture; Rigid boxes, Folding Cartons – Design, Manufacturing; Solid fibreboard packaging, Paperboard based liquid packaging, Moulded pulp containers. **Unit: V** Corrugated Board: Corrugated Board construction - Flutes/Single, Double, Triple Wall, Board grades, Manufacture, Adhesive Bond, Specifications, Flat Crush/Edge Crush Tests Box Certificates. Box Layout, Types, Manufacture/Scoring Allowances, Optimization, Economy. Compression Test, McKee Formula/ECT, Inserts/Partitions, Stack Height, Pallet Patterns, Banding/Strapping/Taping, Corrugated Board Pallets, Corrugated Board Cushions.	**12** **12**	**4** **4**				

Text and Reference books:

1. Handbook of Paper and Paperboard Packaging Technology , Mark J. Kirwan
2. Handbook on package Engineering -Joseph .f Hanlon
3. Paper and paper board -Jaes E Kline

5B.Tech(PP)6 Multimedia Technology

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I What is Multimedia? Components of Multimedia, Interaction Devices, Text: Introduction and Implications of Digital Text, Font, Character Codes, Formatting Aspect Text, Hypertext and Hypermedia.	**12**	**4**				
Unit II Image and Audio: Introduction of image- representation, Acquisition, Picture display, Color and Brightness, scanning, Iconography , Basic Image Editing Steps and File format. Introduction of Audio-Digital Audio, Sample, sample rate, Digital Audio editing and representation, pitch, Volume, Ampitude and Frequency, Audio File Format, Audio compression.	**12**	**4**		1		
Unit III Graphics and Animation: Design of statistical and schematic data,Cartography. Animation:- Animation principles, Types, Frame rate, Animation file formats, Introduction of Flash- Timeline, Frame based Animation, Tween-Based Animation, Layers, Action Script, File Formats.	**12**	**4**				
Unit IV Video:-Video capture,Analog video vs. digital video, Video formats and standards Video compression, Video Editing.	**12**	**4**				

Unit V HTML5, JavaScript, eBooks: Introduction HTML5: Tags, web page, Frame, Form, Table, Image and Embedding media. Introduction Java script: syntax & conventions. Creating script, Hiding the script , Variables, Expressions, Branching & Looping statements, Functions, Arrays Objects, Events & Document Object Model – on Click, onMouseOver, onSubmit, onFocus, onChange, onBlur, OnLoad, onUnload, Alerts, Prompts & Confirms Introduction of ebooks: ebook reading devices, e-book reader software, applications and formats.	**12**	**4**				

Text and Reference books:

1. Multimedia Technologies, Ashok Banerji
2. Multimedia: Making It Work,7/E Tay Vaughan

6B.Tech(PP) 1 Technology of Colour Separation.

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Introduction to colour-** Basic colour theory, additive and substractivecolours, process colours, application of the colour theory in colour reproduction. Overview of colour reproduction from original to printing.	**12**	**4**			**8**	
Unit II **Choosing a original for colour Reproduction -**Exposure level, colour balance, memory colours, contrast; highlight retouched original, evaluation the transparency.	**12**	**4**			**8**	
Unit III **Colour Reproduction -** Essential requirements of cameras, lens, illuminations filters and half tone screen for colour reproduction work Tone and colour controls Gray scale and colour control patches the ink/paper/print interaction Measurement and control of colour printing Using the densitometers. **Colour Separating methods -**Basic principles of colour separation Direct separation method and Indirect colour separation method procedure, Fake colour separation method and procedures followed for making the black printer	**12**	**4**	1		**8**	
Unit IV **Colour correction -**Objectives of colourcorrection ; Hand correction, Purposes and procedure followed; retouching techniques; correcting colours, tones and shades given inks and paper. Dot etching, purposes and procedure, flat ethcing, staging and etching, local reduction, blending; Masking;	**12**	**4**			**8**	

purposes of masking types of maskings; their clarification and uses; Electronic colourseperation and correction. **Unit V** **Colour proofing-** Press proofing methods and various pre-press proofing systems; uses and limitations of prepress sheet Interpreting pre press proofs and predicting, press resutls Control devices for proofing systems. **Planning for colour work -**Introduction & Working of image capturing techniques of Scanners & Digital camera.	**12**	**4**			**8**	

Text and Reference books:

1. Dr. R.W.G. Hont :- The reproduction of colour. Fountain Press, 4th edition.
2. Miles Southworth& Donna Southworth :-Colour Reproduction. Graphic Arts Publishing, 3.1 edition.
3. Gary G. Field :- Tone &Colour correction (GATF).
4. Color Separation Techniques , Miles Southworth
5. Handbook of Printing Processes , Deborah L Stevenson Charles Lucas

Minimum topics to be covered in laboratory sessions:

1. Preparation of Half tone negative using process camera.
2. Preparation of own colour control patches.
3. Preparation of Gray Scale .
4. Study of spectrophotometer curve.
5. Working of Image Setter and obtaining output on Image Setter.
6. Study of Colour Correction methods and its need.
7. Study of Software for colour separation.
8. Study of UCR and GCR and its applications.
9. Comparison of manual Separation and electronic separations.
10. Preparations of fake colour separation
11. Preparations manual colour separation

12. Study of electronic colour separation 

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6B.Tech(PP) 2 Technology of Gravure

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I History & Introduction: History and scope of Gravure presses and press work , Gravure printing process & Gravure Machine Designs.	**12**	**4**			**8**	
Unit II Image Carrier Preparation & Image Generation : Gravure screens, Cylinder construction & Preparation - Thin layer method, Thick Layer method, Ballard Shell Treatment, Cylinder Design & its types, Gravure cylinder preparation, Sleeve & Solid cylinders, Considerations for Gravure Cylinder preparation. Chemical engraving methods & equipments, Electronic engraving systems, Image generation	**12**	**4**			**8**	1
Unit III Methods of Gravure cylinder preparation - Diffusion-etch method, Direct transfer, Elecro-mechanical process, Laser cutting, Cell configuration, advantages & disadvantages, Cylinder correction method. Well formation- Variables, Basic types, balancing the cylinder, copper plating & polishing, Reuse of cylinders. Sleeve & integral shafting of cylinders. Cylinder Imbalance- static & dynamic.	**12**	**4**			**8**	
Unit IV						

Doctor Blade & Impression Roller Mechanism: Doctor Blade Materials, Doctor Blade assembly, Blade angles, Blade distance from nip, blade edge, blade mounting. Doctor blade holder configurations, Preparing blade for use doctor blade problems. Doctor blade wear - Fatigue, corrosion, abrasive, adhesive wear. Gravure Impression Roller- Function of Impression Roller, Roller covering, Roller pressure, Balance- static & dynamic. Gravure roller coating. Handling & Storage of impression roller. Impression roller problems. Impression mechanisms- mechanical, hydraulic, pneumatic. New developments. Drying system in Gravure: Gravure Ink dryers - Need for ink dryer , Dryers Functioning , Dryer Limitations, Heat sources- steam , Electric and Gas, Combination gas/Oil. Thermic oil, reuse of Waste heat from incinerators. **Unit V** Gravure substrates and their Calculations : Publication Paper substrates, Packaging Paper Substrates, Non paper substrates Metalised Films & Foils. Inks & Additives for Gravure and their Calculations : Gravure Inks – Constituents of Gravure Ink, Dilution of Printing Ink, Types of Gravure Ink Water based, Solvent based. Polyurethane based, Vinyl based, Dye based. Diff. Kind of additives used for respective inks, other additives, Solvent Recovery System - Solvent Recovery System and their advantage in Gravure Printing Ink. Recent Trends and Future of Gravure : Future of Gravure printing & Packaging Industry, Future of Gravure Publication industry. Recent Trends and new developments in Gravure Industry.	**12** **12**	**4** **4**			**8** **8**	

Text and Reference books:

1. Handbook On Printing Technology (Offset, Gravure, Flexo, Screen) 2nd Edition, Niir Board
2. The Complete Book On Printing Technology, Niir Board
3. GRAVURE Process and Technology, Gravure Education Foundation

Minimum Topics to be covered in laboratory sessions:

1. Study of Various Gravure Printing Machine Configurations.
2. Study of Various components of a Gravure Printing Machine.
3. Study of Cylinder Preparation Methods.
4. Pre-make and Make Ready in Gravure printing process.
5. Study of Feeding Unit of Gravure printing process.
6. Cylinder setting in Gravure Printing Machine.
7. Printing on Single color and multicolor on different Substrate.
8. Identification of problems in Gravure printing.

6B.Tech(PP) 3 Newspaper and Book Publishing

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Definition and concept, parts of a book, basic steps in book publishing, areas of publishing - general publishing, educational publishing, professional publishing and reference publishing Publishing house - the role of commissioning editor, the copy editor , the designer, the production manager, the sales manager and marketing manager, supplychain department, the Finance department, the management, legal department.	**12**	**4**			**8**	
Unit II Publishing house Organization Organizational structure, editorial, sales, marketing, HR ,Production, Legal and commercial. Roles and responsibilities of each department ,interdepartmental relations	**12**	**4**			**8**	1
Unit III Production & Estimating in Book Publishing. P & L: Acquisition costing, on-commissioning cost ,final costing, components of cost in book publishing, process - acquisition cost, typesetting / designing cost, editorial cost, proofreading, copy righting, royalty and royalty advance production cost, MRP discount & returns & their relation. Royalty and royalty advance and their relation. Sponsorship and Subsidy break even ,gross margin, calculation of gross margin. warehouse & Shipping cost ,overheads - marketing cost.	**12**	**4**			**8**	
Unit IV Marketing and Distribution in Book Publishing Home market, export market, closed market, advertising and publicity, types of distribution, conventional and modern channels of distribution. International book trade and barriers. Import and export of books. Components of cost for book production, size of the book, number of copies colour printing (single, 4 color etc) Type of binding ,paper and other materials	**12**	**4**			**8**	

Unit V Legal Aspects in book Publishing-Copyright, types of agreement between author and publishers the outright sale of the copyright, profit sharing agreement, the royalty system, commission agreements The press and the law-libel, defiance against libel, mitigation & damages. Introduction to e publishing in different areas of book publishing (journal publishing, education, professional) work flow and cost structure for e-publishing process.	**12**	**4**			**8**	

Text and Reference books:

1. Epstein, Jason. Book Business: Publishing Past, Present, and Future.
2. Schiffrin, André (2000). The Business of Books: How the International Conglomerates Took Over Publishing and Changed the Way We Read.
3. Abelson et al. (2005). Open Networks and Open Society: The Relationship between Freedom, Law, and Technology
4. Leonard Shatzkin (1982). In Cold Type: Overcoming the Book Crisis. Boston, Mass.: Houghton-Mifflin. xiii, 297 p. ISBN 0-395-32160-3

Minimum Topics to be covered in laboratory sessions:

1. Study of Computerized work flow prepration of a publishing house.
2. Study of marketing and distribution channels for different publications .
3. Developing the programmes fro estimation for different products.
4. Study of P&L modesl for different types of publishing.

5. Study of deferent e-book formats (epub, PRC , PDF) 

6B.Tech(PP) 4 Plastics and Polymer Based Packaging

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Plastics: Introduction, Distinction between plastics, fibres and elastomers, classification of synthetic polymers, techniques of polymerization, processing techniques of plastics. Co-Extrusion: Cast film co-extrusion, Blow film co-extrusion, raw materials, support materials, bonding agents, application of co-extruded film.	**12**	**4**				
Unit II Polyethylene: LDPE: Manufacturing, Effect of density, LDPE resins, additives, conversion techniques, properties, applications, developments, LLDPE: Introduction, Manufacturing, Properties, Processing, Modifications, Conversion, Material Handling, Application, HDPE: Introduction, Injection Moulding, Applications, Blow moulding, Extrusion, compression moulding and applications,	**12**	**4**	1			
Unit III HMHDPE: Introduction, Production, Properties, Applications, Examples. Polypropylene: Introduction, Properties, Applications, Polypropylene copolymers, BOPP: Basic Categories of film and its Qualities.	**12**	**4**				
Unit IV Polystyrene: Properties, Grades, Processing: injection moulding, extrusion, sheet forming, applications. PVC, Nylon, Polyester: PVC: Introduction, Properties, Applications, Nylon: Introduction, Process, Technology of Co-extrusion, Applications, Polyester: Introduction, Properties, applications.	**12**	**4**				

Unit V Miscellaneous Polymers: Expanded Polyethylene: Properties and applications, Plastic Woven Sacks: Material, Method, construction, use, Polycarbonate: Introduction, application in packaging. Testing on Plastics: Introduction, Scope, and Preparation of sample, solubility test, melting behaviour, approximate density, Ignition test, Dry distillation test, chemical colour identification test, pyrolysis test, refractive index, basic equipments, and other testing measures for individual plastics.	**12**	**4**				

Text and Reference books:

1. Advances in plastic packaging technology-John Briston
2. Packaging Design and performance –Frank Paine
3. Packaging Technology: Fundamentals, Materials and Processes , Anne Emblem, Henry Emblem

6B.Tech(PP) 5 Metal Based Packaging.

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Manufacture of Black Plate, Tin Plate Characteristics and Properties, Tinplate, Containers Met pack characteristics and properties, Met pack boxes.	**12**	**4**				
Unit II Aluminum Foil - Manufacture, Properties and Applications in Packaging. Aluminum Collapsible Tubes and Containers: Advantages, Major Uses, Filling Equipment's, Quality Control Measures	**12**	**4**				1
Unit III Aerosol Packaging: Definition, Advantages, components, Manufacturing, Working Principle, Pack contents, Method of filling aerosol containers, Application of Aerosols, Developments.	**12**	**4**				
Unit IV G.I. Drums - Oil Drums – Closures, Lid and Scaler : Introduction, Capacity, Types of Drums, Manufacture of Drums, Quality Control. Closures: Introduction, Types, Parts, Essential Functions, Recent Developments.	**12**	**4**				

Unit V Advantage & Dis-Advantage & application of metal based packaging. Modern trends in metal based packaging.	**12**	**4**				

Text and Reference books:

1. Packaging design and performance- Frank Paine.
2. Packaging Technology: Fundamentals, Materials and Processes , Anne Emblem, Henry Emblem

6B.Tech(PP) 6 Wood and Glass Based Packaging.

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit: 1 Wooden Based packaging: Introduction, Design factors, Qualities of timber, classification of timber, Moisture in timber, effect of moisture on the properties of wood, seasoning of wood, physical and mechanical properties of timber, Defects of timber, methods of preservation of timber waste management.	**12**	**4**				
Unit II Wooden Container considerations: Form and size of each component, thickness of components, size and spacing of nails, number of planks in a shook, type of joints, style of container, reinforcements, workmanship.	**12**	**4**		**1**		
Unit: III Consideration for box design: Type of loads, Grouping of Indian timbers, Plywood boxes-battened construction, timber species suitable for the manufacture of packing cases, wooden box styles. Crates: Introduction, Classification of crates, Selection of crate, Size and weight, Degree of protection, types of Bases, handling of crates, Packaging considerations.	**12**	**4**				
Unit: IV Glass Packaging: Introduction, Properties, Types of Glass, Glass Manufacturing, Applications, Advantages, Standards. Glass containers: Types. Glass containers parameters.	**12**	**4**				
Unit: V						

Testing of glass: Physical Testing: Annealing Test, Thermal Shock Test, Pressure Test, Impact Test, Density Test, Gauging, Chemical Testing: USP Tests. Modern trends in wood & glass based packaging. Man made wood , paper palette , corrugated cartons, aluminum foil, plastic containers .	**12**	**4**				

Text and Reference books:

1. Packaging design and performance- Frank Paine.
2. Packaging Technology: Fundamentals, Materials and Processes , Anne Emblem, Henry Emblem

7B.Tech(PP)1 Industrial Management& Plant Layout

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit:1 **Site Selection:** Strategic issues of location. The supply-distribution system, Dynamic nature of plant location strategy-factors influencing choice of location. State regulations on location. Backward areas and Industrial policy. Govt. Policies for decentralization, Industrial estates, comparison of locations-urban v/s rural areas advantages, sub-urban area. Economic survey of site selection. Analytical approach.	**12**	**4**				
Unit:2 **Plant Layout:** Objectives of good plant layout, principles of plant layout, importance of plant layout, situations in which layout problem may arise, factors influencing plant layout, Methods of plant and factory layout-operation process chart, flow process chart, flow diagrams, string diagrams, machine data cards, templates three dimensional models, correlation chart, travel chart, load path matrix method. Types of plant layout -product layout or live layout - process layout or functional layout-combination layout - static layout or fixed position layout. Symptoms of bad layout. flow pattern-line flow, L type flow, circular flow, U type flow, S or inverted S combination of U and line flow pattern. Characteristics and place of application. Factors governing flow patterns: Combination of line flow and S type of pattern. Combination of line flow and circular type. Processing upwards. Retraction type, Inclined flow. Workstation design-Storage Space requirements.	**12**	**4**				1

Unit:3 **Plant layout procedure**: Accumulate basic data, Analysis and coordinate basic data, decide the equipment and machinery required, Select the material handling system, sketch plan of the plot for making factory building. Determine a general flow pattern, Design the individual workstation. Assemble the individual layout into the total layout calculate storage space required, Make flow diagrams In work stations and allocate them to areas on plot plan, Plan and locate service areas, make master layout. Check final layout, Get official approval of the final layout, install the approved layout.	**12**	**4**				
Unit:4 **Factory Building (Press Building):** Introduction, Advantages of a good factory building, Factors affecting the factory building - nature of manufacturing process-flexibility-expandability-service facilities-employee facilities-lighting-heating-ventilating-air conditioning-appearance- durable construction-security measures-noise control. Types of factory building - single story building, high bay and monitor type buildings, multi storey buildings, building of special types. Comparison between single storey and multistory building. Types of construction of factory building Wood frame construction, Brick construction, Slow burning mill construction, Steel frame construction, Reinforced concrete construction, Precast concrete construction. Specific parts of factory building-roof, walls, floor, fire safety designs	**12**	**4**				
Unit:5 Plant layout-An analytical approach: Heuristic and other methods of line balancing. Planer single facility location problems. Minisum examples, insights for minisum problem, minisum location problem with distance. MLP with Euclidean distance.	**12**	**4**				

Text and Reference books:

1. Facility layout and location-Richard L.Francis, John A. White.
2. Computer Aided Production Management - Mahapatra
3. Production and Operations Management - Mchelmann Oakland, Lockyer
4. Practical Plant Layout - Herold B.Maynard
5. Industrial Engineering Management System- Dr. S. Dalela, Dr. Mansoor Ali
6. Industrial Engineering & Management - O. P. Khanna
7. Industrial Engineering and Production Management-M. Mahajan.
8. Materials handling for Printer - A. John Geis, Paul L. Addy

7B.Tech(PP)2 Project Management & Entrepreneurship Development

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit:1 Project Management- Concept, Nature, Development Scope, Planning, Organising, Motivating, Controlling resources, Managing timeline approaches, traditional approaches, critical chain project management, event chain management, process based management, lean project management, extreme project management.	**12**	**4**				
Unit:2 History and evolution, Need for entrepreneurship and self-employment development, modern means of management**,** Design process- morphology of design, role of a technocrat, trade cycle, production, consumption cycle, industrial policies, design of an industrial project, stages of development of the project, preparation of the project report.	**12**	**4**				**1**
Unit:3 Feasibility study: information and needs analysis, input/output analysis, translation into goals. Physical reliability, economic viability. Market survey, demand forecasting, predicting share in the market.	**12**	**4**				
Unit:4 Product design and development: physical reliability, functional aesthetic, production and economic cost aspects, value analysis, product analysis and specifications. Distribution: sales strategies, sales organization, distribution channels, after sales service.	**12**	**4**				

Unit:5 Financial and capital requirements: price fixation, cash flow statement, return on investment, sources of finance, execution of project and commencement of production. Organizations and institutes promoting entrepreneurship in India.	**12**	**4**				

Text and Reference books:

1. Entrepreneurship Development- Colombo Plan Staff College for Technician Education
2. Entrepreneurship Development & Management- Jose Paul, N. Ajith Kumar
3. Entrepreneurship Development Programs & Practices- Jasmer Singh Saini

7B.Tech(PP)3 Packaging Machineries & Processes

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr +20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Lamination machine- Hot lamination machine, Thermal lamination machine, Cold lamination machine, Coating machine	**12**	**4**				
Unit II Die cutting machine, Slotters, inline pouching machine	**12**	**4**				
Unit III Pasting machine, stitching machine, sealing machine, Counting and wrapping machine, Pouch sealing machine, Tin mounting machine, Blow moulding machine	**12**	**4**				
Unit IV Lamination Process- Hot, cold, thermal, special effect, coatings- aqua, varnish, UV, special effect	**12**	**4**	**1**			
Unit V Die cutting processes- cutting, scoring, creasing, bendings, perfurating, punching Slitting Process- bending, cutting.	**12**	**4**				

Text and Reference books:

1. Packaging Machinery Handbook, John Henry CPP

Minimum Topics to be covered in laboratory sessions:

1. Study of coating machines
2. Study of laminating machines
3. Study of die cutting machines
4. Study of slitter and cutter
5. Study of gluers and pasters
6. Study of stitching machines 

7B.Tech(PP)4 Machine Maintenance Management

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Drive and Control Systems Transmission systems such as AC and DC motors, belt, chain, gear, cranks, connecting rods, paul and ratchet mechanisms, Hydraulic, Pneumatic, Electrical, Electronics and mechanical controls.	**12**	**4**				
Unit II Erecting and Testing Equipment needed for erection - selection of location and environmental conditions - erection procedure for various prepress printing and finishing equipments and machinery	**12**	**4**				
Unit III Repairs and Reconditioning Principles of reconditioning -repair methods for various parts - Roler copperising and rerubberising - ebonite covering damping and inking systems - paper transport systems and feeder head.	**12**	**4**		**1**		
Unit IV Cylinders, Bushes and Bearings Cylinder contruction - testing run out and taper - cylinder bearing supports - eccentric bushes - removal and fixing of bushes - changing of oil seals maintenance of bushes and bearings.	**12**	**4**				

Unit V Maintenance procedures Need and importance of maintenance - Definition, types, Maintenance policies - Maintenance organization - Maintenanceof pumps and compresser - Lubricants, their types and Characteristics, Lubricating methods - Central lubrication with return oil Manual lubricating Greases, oils, Greases, oils, grades - preventive maintenance, break down maintenance. Identification & rectification of faults. Maintaining different types of Letterpress, Offset, Gravure & Flexo Machine.	**12**	**4**				

Text and Reference books:

1. Electrical Engg. By B.L. Thareja Part I & II
2. Theory of Machines By Khurmi & Gupta S.Chand Publisher New Delhi
3. Maintenance Engineering And Management, R. C. Mishra, K. Pathak

4. MAINTENANCE ENGINEERING AND MANAGEMENT, V. VENKATARAMAN

7B.Tech(PP)5 Specialized Packaging

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit:1 Lamination machines- Principles, types (hot, cold, thermal, pattern, interactive, security laminations) coatings- special effect coatings, photo sensitive coating, coating machines	**12**	**4**				
Unit:2 Thermoforming machines, shrink wrap, skin pack, blister pack, wrapping machines	**12**	**4**				
Unit:3 Strip packing. stretch packing, paper paletting, customized and personalized packing.	**12**	**4**				
Unit:4 Metal converting machines, cup and plate making machines. Machines used in making caps and closures.	**12**	**4**				1
Unit:5 Innovative packaging- product, size, style, shape, durability, aroma, speciality, metpack , indicative packing, show through packing, interactive, self cooling/ heating, braille printed packages.	**12**	**4**				

Text and Reference books:

1. Advanced Thermoforming- Sven Engelmann

2. Screen Printing Technology- Niir Board
3. Package Design Workbook: The Art and Science of Successful Packaging, Steven DuPuis, John Silva

7B.Tech(PP)6 Technology of Web Offset

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Development and growth of web offset presses** Full size and mini web presses ; basic types of web offset presses Presses specially used for newspaper and magazine production in single and multicolour, Factors to be considered for selecting the press. **Components of web offset press** Infeed, tension control Pre-conditioners, drier and chill rolls, folders, sheeters and winders, Adjustment, operation and maintenance of the major components.	**12**	**4**			**8**	
Unit II **Inking and dampening systems for web offset** Conventional and non-conventional dampening systems, UV inks and setting systems Causes and correction of ink-related problems Properties and requirements of heat set inks. **Web Control** Roll stands and automatic pasters, Detection of web breaks and control of tension, Web Flutter, casues and correction of misregister Control of fan out, Sidelay, cut-off, web-to-web and ribbon control.	**12**	**4**		**1**	**8**	
Unit III **Auxiliary equipment** Various types of in-built and optional equipment availability for web-offset and their uses; equipment essentially needed for newspaper & magazine production.	**12**	**4**			**8**	

Plate and blankets Various types used for web-offset their characteristics, merits and demerits for specific work, Cylinder pressures and Printing Make-ready. **Web-paper** Properties and requirements of paper used for web offset Printability, Care and handling of rolls. **Unit IV** **Dry Offset** Why dry-offset; adventages and disadvantages Comparative study of dry offset, letterset and lithographic offset processes, difference between dry offset and letterset machines and inks job suitability. **Driography or Waterless lithography** Description of the process, Method of producing image and non-image areas Importance of the correct formulation of waterless lithographic inks. **Introduction to types of drives used in web offset machines** **Brief introduction to control pannels of the web offset machines.** **Unit V** **Folders** Introduction, folding principles, parts of folder, combination folder, ribbon folder, double-former folder, the me- chanics of folding process of jaw fold, chopper fold mechanism. Operation of collect cylinder, press folders, double former prefolder, flow folders, insert folders. **Inline Finishing** Introduction, gluers, paster wheels, remoisterable pattern gluers, segmented gluers, envelope pattern gluers,backbone gluers. Pattern perforating and numbering units-sheeters, variable rotary cutters. Auxilliary Equipments -Remote control console, Plate scanners, scanning densitometer, closed-loop system, web preconditioners, sheet cleaners, ink agitators, water coded ink oscillators, fountain solution recirculation systems, fountain solution mixers, refrigerating fountain solution, automatic blanket washers, side lay sensors, web break defectors, remoisturizers-liquid applicator system, roller applicators systems, antistatic devices, Imprinters, Perfectors, cutoff controls, straboscope, synchroscope, counters-Denex laser counter, stobb counter.	**12** **12**	**4** **4**			**8** **8**	

Text and Reference books:

1. Web offset press operating- **David B. Crouse**
2. Offset M/c II - **C. S. Mishra**
3. Manual for Lithography Press Operation - **A. S. Porter**

Minimum Topics to be covered in laboratory sessions:

1. Premake ready operations.
2. Make ready operations.
3. Multicolour job printing.
4. Trouble shooting during printing.
5. Study of electronic panel.
6. Blanket and plate cylinder setting.
7. Damping roller setting.
8. Inking roller setting.
9. Study of Web-breaks.
10. Study of web folders.

7BTech(PP)7 Industrial Training

1. **Industrial Training (4 Weeks during vacation) – 80 contact hours workload is expected during the training including the preparation and presentation time. 40 hours are invested in training during vacation, remaining 40 hrs – 2 hrs/week will be used for the rest of the work**
2. **Guidelines and Evaluation Criteria for the Industrial Training will be decided by the Committee duly proposed by the Head of the Department.**

8B.Tech(PP)1Finishing Technology

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Introduction : Bindery In The New Millennium, Latest Developments in Print Finishing. Organization and Workshop Layout. Importance of Book Binding. Growths Factors In Print Finishing. Book Binding Tools- Forwarding Tools, Finishing Tools. Binding Room Equipments- Laying Press, Standing Press, Sewing Frame, Glue Pot, Board Cutting. Book Binders Materials & Quality Control. British Standard Paper Sizes. International Paper Sizes. Ra & Sra Sizes. Advantages of Iso Paper Sizes. Board - Kinds of Boards.	**12**	**4**			**8**	
Unit II Reinforcing Materials. Securing Materials, Covering Materials, Adhesives- Factors Governing The Choice Of Adhesives, Use of Adhesives In Print Finishing, Effect of Wet Adhesives. Theories of Adhesives. Principles of Adhesives. Solvent Based Adhesives, Water Based Adhesives, Pressure Sensitive Adhesives. Types of Adhesives. Adhesion- Physical, Specific. Miscellaneous Material.	**12**	**4**	**1**		**8**	
Unit III Hand Folding- Folding To Paper, Folding To Print, Lump Folding, Puckering, Advantages & Limitations of Hand Folding. Machine Folding - Knife Principles, Buckle Principle, Combination of						

Knife & Buckle. Folding & Machine Direction. Advancements & Developments on Folding Machine, Folding Machine Paper Feeders. Securing Methods: Wire Stitching - Saddle Stiching, Side Stiching, Stabbing. Thread Sewing Adhesive Binding/Perfect Binding - Advantages. **Unit IV** Finishing Processes: Cover Decoration & Other Processes. Print Finishing Operations - Embossing & Debossing, Blind Embossing, Gold Blocking /Foil Stamping. Die Printing. Thermography, Velvet Printing, Marbling, Varnishing, Graining, Laminating, Gumming, Gluing, Punching, Perforating, Drilling. Label Puching, Appliqué. Edge Decoration - Requirement, Colouring The Edges, Marbling Edges, Edge Guilding. Round Corner Cutting. Numbering - Folio Numbering, Double Numbering, Duplicate Numbering. Principle of Rotary Numbering. Skip Numbering, Automatic Numbering. Kindes of Indexes. Banding & Lacing, Poly Bagging, Mailing, Creasing, Bundling, Tacketing. Ultra Violet Curing & Infra Red Curing. **Unit V** Binding & Finishing Machines : Study of Various Modern Machines. Modern Guillotines - Single Knife Guillotines. Three Knife Trimmers. Knife Grinding M/c. Gold Blocking/Foil Stamping M/c. Wire Stitching M/c. Straw Board Cutter. Laminating M/c - Small Laminating M/c. Pouch Laminating M/c. Tunnel Laminating M/c. Tipping M/c. Smashing M/c. Back Gluing M/c. Roller Gliding M/c. Inline Rounding M/c. Lining M/c. Modern Lining M/c. Cloth Cutting M/c. Foil Blocking M/c. Rotary Blocking M/c. Casing In M/c. Case Making M/c. Box Waste Disposal Process. Box & Carton Manufacturing Process. Adhesive binding machine.	**12** **12** **12**	**4** **4** **4**			**8** **8** **8**	

Text and Reference books:

1 Book Binding- John Mason
2. Binding and Finishing- Ralph Lyman
3. Finishing Processes in Printing- A. G. Martin

Minimum Topics to be covered in laboratory sessions:

1. Preparation of writing board.
2. Preparation of following type of Mechanical binding - Spiral wire binding, Wire ‘O’ binding, Ring binding.
3. Preparation of files of following designs - Loose leaf file - single piece, loose leaf file - Two piece tab binder, loose leaf guard file - Boards joined with spine strip, Court case file, Portfolio - Closed file to keep confidential loose sheets.
4. Preparation of telephone directory with Indexes and Tabs.
5. Study of various controls, operations and mechanisms of the following machines: Folding machine, Guillotine machine, Cutter and Creaser, Varnishing machine, Laminating machine,
   Miscellaneous machines.
6. Print finishing operation to be conducted, Gold blocking, Embossing, Edge decoration,
7. Thermography, Marbling, Velvet printing, Rubber printing, Die printing, Pouch lamination.
8. Book Printing (Flush Cut/ Extra squires)

8B.Tech(PP)2 Quality Control & Supply Chain Management

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit: 1 Introduction : Definition of Quality, Quality control, its meaning and purpose setting up a Quality Control Programme, and establishing necessary System and procedures, economic consideration. Management Consideration: Quality Control as an attitude and management tool, management's responsibility, organization and personnel functions, getting everybody involved. Total Quality Control. Quality Control procedures and methods. Different shapes of quality control.	**12**	**4**				
Unit: 2 Materials Control: Establishing clear specifications and standardization of materials to be purchased, Inspection and testing of incoming materials as part of quality control; importance of proper handling and maintaining records of performance of materials Sampling and sampling plans. Establishing Quality control programme in different departments of Packaging Plant.	**12**	**4**				
Unit: 3 Quality Control Instrumentation : Paper and paper board testing instruments for testing printability, print quality and end-use requirements, Ink testing instruments for testing optical and working properties and end-use requirements Process control instruments, devices and aids used in the galley						

and dark-room, striping department, plate room and press room for specific processes and for general purposes Press sheet control devices used for production of multi-colour printing jobs Basic principles of these instruments and devices how they function and what they measure, minimum instrumentation necessary to produce a product consistent with the appropriate quality level. Introduction to ISO:9000 and ISO:14000 series.	**12**	**4**				**1**
Unit: 4 Supply chain management (SCM) – concept of logistics and SCM – decision phases – design, planning and operation – decision areas – type of supply chain views - flows in supply chain – supply chain and competitive performance – performance measures for SCM – strategic fit – drivers of supply chain. Sourcing and Procurement : sourcing – factors in source selection – vendor rating – qualitative and quantitative methods – purchasing – objectives and procedure – purchasing systems – tender method – computer based systems/EDI – inventory concept – functions of inventory – selective inventory control techniques – structure of inventory problem – costs associated with materials management – relevant costs.	**12**	**4**				
Unit: 5 Independent demand items – probabilistic – single order quantities – payoff matrix – incremental analysis – mathematical formulation of discrete and continuous cases – independent demand items – deterministic and dynamic – deterministic inventory models without and with backordering – sensitivity analysis – quantity discount – all units and incremental discounts. Independent demand items – probabilistic and dynamic inventory models – Q and P system models – dependent demand items – deterministic models – lot sizing models –lot by lot – EOQ – part period balancing – wagner-within method – concept of just-in-time – kanban – introduction to distribution requirement planning.	**12**	**4**				

Text and Reference books:

1. W. H. Banks, Inks, Plates and Print Quality, Pergamon Press

2. Quality Control For Quality Printing, Graphic arts, Technical foundations 

8B.Tech(PP)3 Security Printing And Counterfeiting

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I **Principles of stochastic screening:** Spot patterns. Gaininess or noise.Combining AM and FM screening.Screen angles. Spot size. Claimed benefits for FM screening. Absence of rosettes and moiré patterns.Improved rendition of detail. Smoother tonal transition	**12**	**4**				
Unit II Photographic smoothness.Improved process colour simulation of spot colours.No restriction on reproducible grey levels.Tone value stability with increased inking. Smaller file size and speedier output through imagesetter.Decreased register sensitivity. Limitations associated with FM screening.	**12**	**4**		**1**		
Unit III Film imaging. Film contacting. Plate making. Photomechanical proofing.High levels of dot gain. Fine screen rulings versus FM screening.	**12**	**4**				
Unit IV **Practical experiences with offset litho printing:**	**12**	**4**				

Platemaking. Exposure and tone transfer.Using FfM and AM screening together.Vacuum contact and Newton's rings. Negative working plates. Proofing.Negative proofing. Printing. Dot gain in printing. Influence of FM screening spot size. **Unit V** Influence of different screening algorithms. Tone value stability when printing. Sensitivity to register shifts. Colour shifts, RFID application, Holographic application	**12**	**4**				

Text and Reference books:

1. Forms for the 80"s. How to design and produce them - Gar Raines.
2. Stochastic Screening - Kelvin Tritton.
3. Introduction To Security Printing , Richard D Warner, Richard M Adams Dr, Make Believe
4. Optical Document Security, Third Edition , Rudolf L. Renesse

8B.Tech(PP)4 Costing & Estimating

Maximum Marks 100
Distribution of Marks: 80 Th. + 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Concept of cost, Analysis of cost, fixed cost, variable cost, Elements of cost and its method of recovery.	**12**	**4**				
Unit II Purpose of costing and estimating from printer's point of view & customer's point of view, Difference between costing and estimating, Qualification of an estimator, estimators tools. Introduction to finance & DBMS.	**12**	**4**				
Unit III Job costing, its need and procedures, Cost sheet, work Docket, WIT and its importance in costing. Type of costing system for printing industry & related problem.	**12**	**4**		**1**		
Unit IV Estimating paper- selection of papers, allowance for wastage, allowance for trimming, weight of loose sheets, and weight of reel of papers. Estimating inks – Inks consumption formula, Ink allowance for spoilage.	**12**	**4**				
Unit V						

Estimating binding materials – board requirement, covering materials. Estimating sewing thread, estimating wire, estimating adhesives.	**12**	**4**				

Text and Reference books:

1. Printing Estimating- Philip Kent Ruggles
2. A Text Book of Estimating and Costing- M. A. Aziz

8B.Tech(PP)5 Digital & Advance Printing Processes

Maximum Marks 150
Distribution of Marks: 80 Th. + 50 Pr+ 20 IA

	Lectures	Tutorial	Seminar	Workshop	Demo/Pr	Field Visit
Unit I Digital Documents: Introduction to Digital Printing fundamentals Pixel image, Digital image, Digitization, Half toning colour reproduction, colour jumbs, resolution and its qualities. Acquiring: Scanning of different original, Selection of technology of Programme. Transfer of Digital Photographs. Documentation: Image file formats, TIFF, EPS JPEG files text files and past discription languags. Digital Printing Processes, Silver faldire, Phernal, Inkjet, electrostatic processes.	**12**	**4**			**8**	
Unit II Rendering Type line Art and images. Colour management, Introduction and future, Characterizing input and output device use of CIELAB, CMS. Market & Applications: Introduction. Defining on demand. Defining Digital Printing. Defining variable printing. Typical lengths. Short-run process colour printing.	**12**	**4**			**8**	**1**
Unit III On demand printing & Publishing concepts. Future on-demand. Market research Where are pages created. Number of originals and run length. New technologies shift existing methods. Economics of on demand printing - Economics of long run. Advantage for the buyer. Efficiencies of Digital on demand work flow. Short-run pricing paradox.	**12**	**4**			**8**	

Unit IV Advance printing processes and techniques and Hybrid systems. Concept Printing, 3D printing- sculpture, bio, food, structure and other innovative areas	**12**	**4**			**8**	
Unit V Printed electronics- Inks for printing electronic structure, the printed antenna, organic semiconductor inks Polymer based electronics- Nano printing and recent engineering trends in printing and packaging.	**12**	**4**			**8**	

Text and Reference books:

1. Digital Printing On demand Printing- Howard M. Fen ten, Frank J. Romanos
2. 3D Printing: The Next Technology Gold Rush - Future Factories and How to Capitalize on Distributed Manufacturing , Christopher D. Winnan

Minimum Topics to be covered in laboratory sessions:

1. Study of different file formats.
2. Different file formation.
3. Study of color caliberation & measurement system.
4. Practising of customized and variable data printing
5. Study of Special effect inks & coatings
6. Experiments with existing process with innovative ideas.

8B.Tech (PP)6 Major Project

Guidelines and Evaluation Criteria for the Major Project will be decided by the Committee duly proposed by the Head of the Department