



Basics of Printing Technology (BT PPT 301A)

Course Title : Basics of Printing Technology

Course Code : BT PPT 301A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about the history of printing.
- To study about different developments in printing.
- To study about different printing process.
- To study about basic operation in printing.

Unit: I

Brief history of printing in the western countries and India. A brief survey of the evolution of printing processes and methods from to the present day technology. Introduction to printing processes, basic principles, characteristics, identification and application of letter press, flexography, offset, gravure, screen and Electrostatic printing etc. Suitability and limitations of various processes of printing. Equipment and tool used for relief printing processes.

Unit: II

Letterpress machines: Classification, types of platen, cylinder and Rotary presses their working principles, inking com common printing defects, causes and their remedies.

Lithographic printing process: Introduction, characteristics of lithographic printing, classification of offset printing, different units of offset machine, pre-make ready & make-ready steps, machine production, introduction of offset plates, inks & substrates.

Unit: III

Flexography printing process: Introduction, characteristics of flexography, components of flexo press, flexo plates, flexo presses, introduction to flexo inks & substrates. Gravure printing process: Introduction, characteristics of Gravure, Principles of Gravure printing, basic components of gravure press, brief introduction to image carrier preparation for Gravure printing, Gravure ink & substrate.

Unit: IV

Screen printing process: Introduction, application of screen printing, tools, equipment's & accessories used in screen printing, Stencils – knife cut stencils, photo stencils – Indirect stencil systems, direct photo stencil systems, capillary systems, and direct/indirect photo stencil systems screen printing process steps, Introduction to screen inks, substrates & image carriers. Digital printing: Introduction, various, digital printing technologies & Brief introduction to digital inks & substrates.

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**Reference Books:**

1. "Flexography: Principles & Practices", 5th Edition, FTA, 2000.
2. "FIRST: Flexographic Image Reproduction Specifications & Tolerances", 3rd Edition, FTA, 2003.
3. Samuel B. Hoff, "Screen Printing – A Contemporary Approach", Delmar Publishers, 1997.
4. Ingram, Samuel, "Screen Printing Primer", GATF press, 2nd Edition, 1999.
5. Handbook of Printing Processes (GATF publications) by Deborah L Stevenson (Author), Charles Lucas (Illustrator)
6. Printing Technology 5th edition, Publisher: Delmar, 2002
7. The Gutenberg Revolution: How Printing Changed the Course of History.

Course Outcomes:

- Students know about the invention of printing.
- Students know about the developments of printing.
- Students know about different printing processes.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Arjun Bhandari



Basics of Packaging Technology (BT PPT 302A)

Course Title : Basics of Packaging Technology

Course Code : BT PPT 302A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about different packaging element of packaging.
- To study about different developments in packaging.
- To study about different packaging processes.
- To study about basic operation in printing.

Unit: I

Basics of Packaging: Definition and historical back ground, purposes and functions of packaging, Packaging media, Mechanical, chemical and biological protective functions of packaging, odour and flavor contamination, shelf life, Interaction between package and its contents, Types of packaging.

Unit: II

Packaging Design: Consumer research and sales promotion through package design, Factors influences design, Surface design to suit production limitations, Consideration of design and marketing.

Unit: III

Packaging Technology: Paper based packaging; applications, advantages and limitations, Glass and plastic based packaging; applications, advantages and limitations, Wood, jute and textile based packaging; applications, advantages and limitations.

Unit: IV

Packaging Materials: Paper and board; Characteristics and uses performance requirements – grammage, caliper, stiffness, bursting strength, surface finish etc. Different kinds of fiber boards: Solid boards, corrugated boards, conversion properties, advantages and limitations, Cellulose film: properties, manufacturing, applications, and limitations, Plastic based packaging materials: Different materials, applications and limitations, Flexible packaging materials: Different materials used, flexible laminates, various combinations and applications, characteristics and limitations, Metal bases packaging materials; kind's applications, advantages and limitations.

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**Reference Books:**

1. The Big Book of Packaging - Mr. Sandeep Kumar Goyal
2. The Eight Elements of Powerful Package Design Paperback – November 19, 2013 by Fumi Sasada (Author), Giles Murray

Course Outcomes:

- Students know about the invention of packaging.
- Students know about the element and principal of package design.
- Students know about the developments of packaging.
- Students know about different packaging processes.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Arun Bhandari



Printing Process Lab (BT PPT303A)

Course Title : Printing Process Lab
Course Code : BT PPT303A

L	T	P	Credits
0	0	2	1

Class-work Marks	: 30
Exam Marks	: 70
Total Marks	: 100
Duration of Examination	: 3 Hours

List of Experiments:

1. Identification of different tools & equipment used in various printing process.
2. Introduction of different printing process.
3. Schematic diagram of different printing processes.
4. Study of various types of Image carriers for different printing process.
5. Overview pre-make ready & make ready.
6. Study of different printing press.
7. Overview of machine production for multi-color printing.
8. Study of running & printing faults on different printing process machine.

Annex B



Electronic Composition (BT PPT 304A)

Course Title : Electronic composition

Course Code : BT PPT 304A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objective

- To know about different computer input and output devices.
- To know about pre-press for copy preparation.
- To know about DTP software

Unit: I

Preparing copy for press. Input output devices: keyboards, mouse, light pen, touch screen, desktop scanners, pointing device, and automatic-voice recognition. Optical character recognition: working principle, factors affecting performance. Proofing, different proofs, proofing stages, proof correction marks, correction of type set matter.

Unit: II

Basic principle, image setter Small, Medium and Large format image setters. Computer to film and computer to plate processing, environmental issues, other factors. Page description languages. Post Script Language – Introduction. PostScript Fundamentals-Structure of PS file. Adobe acrobat, reader and Distiller.

Unit: III

Desk Top Publishing: introduction, Origin, components of DTP, applications of DTP. Benefits of DTP. Developments of DTP. Software for DTP – word processing, Graphic programs. Illustration programs, Business Graphics, CAD design programs, Type manipulation software, OCR software, Image software. Presentation graphics. Image editing software: Image editing commands-crop, marquee tools, cloning tool, cut & paste, image filters. Page make up software – approach, typography, document & text handling, applications. Standard program features – Adobe PageMaker, Corel Draw, and Quark Xpress. Hardware & software for colour. Peripherals & add ones – front–end peripherals, graphics tablets, scanners for text, line art & images, video digesters. DTP as a typesetting front end – distributed desktop, Exploring MS- Office.

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Unit: IV

Digital Fonts, True type fonts, Post Script Type 1, Bitmapped fonts, Adobe type manager, Transferring fonts, Font manipulation software, Vector & Bitmap text and Graphic creation, Raster Image Processing, Digital O/P, Creation of type for digital system, Future trends and developments.

Reference Books:

1. Desk Top Publishing 4th edition – Kirty Wilson, Davis, Ron Strutt.
2. Typesetting-Composition-Geoff, Barlow
3. Word Processor to Printed Page - Micheal Card
4. Digital Typography-Donald E.Knuth Introduction to Prepress - High Speirs
5. Introduction to Printing Technology - Hugh Speirs Composing and Typography Today - Mendiratta.B.D. Hand Book of Typography - Kailas Takle. Guide to DTD-James Cavuoto
6. Printing Technology - Adams Printing in a Digital World – David Bergsland

Course outcomes:

- The students will be able to prepare a copy/dummy in prepress.
- Read about proofing and correct the mistake in before OK to print.
- Use the input and output devices for printing.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Electronic Composition Lab. (BT PPT 305A)

Course Title : Electronic composition

Course Code : BT PPT 305A

L	T	P	Credits
0	0	2	1

Class-work Marks : 30

Exam Marks : 70

Total Marks : 100

Duration of Examination : 3 Hours

List of Experiments:

1. Familiarizing with Key Board.
2. M.S. Word – Commands, designing and practicing.
3. Adobe Illustrator – Commands, designing and practicing.
4. Photo Shop – Commands, designing and practicing.
5. CorelDraw – Commands, designing and practicing.
6. Working of Digital printing.
7. Working with DTP.
8. Few new design software.

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Printing & Packaging Materials Science-I (BT PPT 306A)

Course Title : Printing & Packaging Materials Science-I

Course Code : BT PPT 306A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about polymer materials.
- To study about surface chemistry.
- To study about various substrates and metals.

Unit: I

Polymers: Monomers and polymers, photopolymers and copolymers. Type of polymerization reactions-addition and condensation, mechanism. Type of polymer-plastic, rubber and fibres, mechanical properties, Chemical properties, vulcanization of rubber. Composition and characteristic of polymers-printing ink, resin, vehicles, adhesive, and film base cellulose and gelatin.

Unit: II

Colloids and Surface Characteristics: Kinds, characteristics and properties, application in printing industry. Surface Tension, contact angles and capillary action.

Unit: III

Substrate: Fibrous and non-fibrous raw material used in paper and board, their relative properties. Varieties of paper and board, characteristic, classification and testing-mechanical, optical. Other substrates-metal foil, plastic, cellulose, synthetics. Brief description of machine, steps of pulping process, sizing, improvement of properties, calendaring, and coating-materials required.

Unit: IV

Metals and Alloys: Steel, Nickel, Chromium, Aluminum Electroplating, Galvanizing Alloy. Heat treatment of Steel.

Reference Books:

1. Printing Science - L C Young.
2. Printing Materials - Bob Thompson.
3. Printing Material - Prakash Shetty
4. Material for printing process by Focal Publishers.
5. Advance Science for Learning.

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**Course Outcomes:**

- Students know about the application of science in printing and packaging.
- Students know about application of colloids & role of surface chemistry in printing.
- Students know about various substrates and metals used in printing.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Basics of Printing and Packaging Technology (BT PPT 307A)

Course Title : Basics of Printing and Packaging Technology

Course Code : BT PPT 307A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about basics of packaging.
- To study about different printing processes.
- To study about basic operation in printing and packaging.

Unit-I

Introduction to Major Printing: Letterpress Printing-Introduction, Classification of letterpress printing machines, Advantages and dis-advantages, and applications. Flexography-Introduction, flexographic market and products, mechanical principles of flexography-Fountain roll, Anilox roll, cylinder and impression cylinder. Flexography press types –Stack press, central impression cylinder press and inline press.

Unit-II

Gravure: Introduction, Different units of Gravure Printing Machin ,Pre-make ready & make ready steps and its application Screen printing- Digital printing process-Introduction and application. Advantages and dis-advantages.

Unit-III

Basics of Packaging: Introduction, Classification of Packaging, Functions & roles of a packaging, Factors influencing design of a package. Types of Packaging - Flexible package, rigid package & semi-rigid package. Markings on package – Handling marks, routing marks, information marks.

Unit-IV

Folding cartons – Production steps, types. Corrugated containers – classifications, components in a corrugated board, flutes & stages in preparation in corrugated boards. Plastic corrugated boards- features & advantages. Introduction to Innovative Packaging Techniques: Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, and strip packaging.

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**Reference Books:**

1. The Big Book of Packaging - Mr. Sandeep Kumar Goyal
2. The Eight Elements of Powerful Package Design Paperback – November 19, 2013 by Fumi Sasada (Author).
3. Printing Technology 5th edition, Publisher: Delmar, 2002
4. Art and Print Production - N.N. Sarkar.

Course Outcomes:

- Students know about basic elements of packaging.
- Students know about different printing processes.
- Students know about innovative packaging techniques.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Environment Studies (BT AUD308A)

Course Title : Environment Studies

Course Code : BT AUD 308A

L	T	P	Credits	Class-work Marks	: 30
3	0	0	0	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Unit: I

The Multidisciplinary nature of environmental studies, Definition, scope and importance. Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.

- Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit: II

Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem.

Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following eco-system:

- Forest ecosystem.
- Grassland ecosystem.
- Desert ecosystem.
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

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Unit: III

Biodiversity and its conservations:

Introduction – Definition: Genetic, species and ecosystem diversity.

Biogeographically classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.

Unit: IV

Environmental Pollution: Definition, causes, effects and control, measures of: a) Air pollution

- b) Water pollution
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal Pollution
- g) Nuclear hazards

Solid waste management: Causes effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies. Disaster management: Floods, earthquake, cyclone and landslides.

Social issues and the Environment:

- a) From unsustainable to sustainable development
- b) Urban problems related to energy
- c) Water conservation, rain water harvesting, watershed management
- d) Resettlement and rehabilitation of people; its problems and concerns, case studies
- e) Environmental ethics: Issues and possible solutions
- f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- g) Wasteland reclamation
- h) Consumerism and waste products

Text Books:

1. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India.
2. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480pp.
3. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental
5. Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd. Down to Earth, Centre for Science and Environment ®.

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**Reference Books:**

1. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
2. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
3. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press, 1140p.
4. Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, 7. Helhi 284p.
5. McKinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Arjun Bhandari



Offset Technology (BT PPT 401A)

Course Title : Offset Technology

Course Code : BT PPT 401A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about the history of lithography.
- To study about different developments in lithography.
- To study about different section of lithography machine.

Unit: I

History of lithography. Print media and Classification of Printing Organizations. 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.

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, shore durometer.

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. 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. Progressive print out.

Unit: IV

Delivery section: role and function of delivery section, transfer cylinder, sheet transfer, sheet delivery, short and extended delivery systems, sheet control devices, anti-setoff spray powder unit. Machine production. Trouble shooting. Printing machine maintenance. Recent Advancement in quality control in sheet fed offset ISO: 12647.

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**Reference Books:**

1. Sheet Fed Offset Technology- Dr. Anjan Kumar Baral
2. John MacPhee, “Fundamentals of Lithographic Printing”, Vol.1 Mechanics of Printing,
3. GATF Press, 2002.
4. A.S.Porter, “A Manual of Lithographic Press Operation”, Lithographic Training Services, London, 1998.
5. Helmut Kippan, “Handbook of Print media”, Springer publications, 2004.

Course Outcomes:

- Students know about the invention of offset printing process.
- Students know about the different parts of offset printing machine.
- Students know about recent advancements in offset printing process.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Offset Technology Lab (BT PPT 402A)

Course Title : Offset Technology Lab
Course Code : BT PPT 402A

L	T	P	Credits
0	0	2	1

Class-work Marks	: 30
Exam Marks	: 70
Total Marks	: 100
Duration of Examination	: 3 Hours

List of Experiments:

1. Study of various controls and operations.
2. Setting the feeder, feed board, lays.
3. Setting the delivery system.
4. Setting the water and ink rollers.
5. Fixing the plate.
6. Study of make-ready operations.
7. Single color printing.
8. Two color printing.

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Packaging Process-I (BT PPT403A)

Course Title : Packaging Process-I

Course Code : BT PPT403A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about the need and function of packaging.
- To study about packaging processes.
- To study about specialty packaging.

Unit-I

Introduction: Need for packaging, functions of packaging-types and selection of package, packaging hazards, interaction of package and shelf life-estimation, Packaging materials-selection criteria, Materials and machine interface, life cycle assessment.

Unit-II

Package Design: Package design, Package specification types of design, structural, graphics, Factors influencing design, fundamentals of graphic layout design, Package colour- Selection criteria- applications, Types of load, unit load - safe stacking load, elements and principles of design, Structural design – cans, bottles, folding cartons, corrugated boxes.

Unit-III

Manufacturing Process: carton manufacturing –Cutting; creasing; die making-punching. Machineries-types, flexible pouches forming machines, corrugated box manufacturing process, Rigid boxes manufacturing process, Collapsible tubes, Flexible pouches forming machines; Metal foil packaging.

Unit-IV

Speciality Packaging :Aerosol packaging, blister packaging, anti-static packaging, Aseptic packaging, Child resistant packages - closures, Modified Atmospheric Packaging (MAP), Vacuum Packaging, Retort packaging, Food packaging - Advancement and developments in packaging; RFID in packaging, Eco-friendly packaging, Export packaging, Labels – Types, functions; Closures-application and types; Cushion Packaging – Need, types, Design Requirements.

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Reference Books:

1. Walter Soroka, Fundamentals of Packaging Technology, Institute of packaging professionals.
2. Bill Stewart, “Packaging Design Strategies”, Pira International.
3. Aaron L.Brody & Kenneth S.Marsh, “Encyclopedia of Packaging Technology”,
4. Walter Stern, “Handbook of Package Design Research”, Wiley Interscience.
5. Paine, “Packaging Development”, PIRA International, 1990.
6. Arthur Hirsch, “Flexible Food Packaging”, Van Nostor and Reinhold, New York.
7. Susan E.M.Selke & et al, Plastics Packaging, Hansar.
8. S. Natarajan. M. Govindarajan, and B Kumar “Fundamental of Packaging Technology” PHI.

Course Outcomes:

- Students know about the function of packaging and package design.
- Students know about various package manufacturing process.
- Students know about application of specialty packaging.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Packaging Process –I Lab (BT PPT 404A)

Course Title : Packaging Process –I Lab

Course Code : BT PPT 404A

L	T	P	Credits
0	0	2	1

Class-work Marks : 30

Exam Marks : 70

Total Marks : 100

Duration of Examination : 3 Hours

List of Experiments:

1. Measurement of Thickness of Paper and board.
2. Measurement of Compression Strength of Paper and board.
3. Measurement of Stiffness of Paper and board.
4. Measurement of Moisture content of Paper and board.
5. Measurement of Folding Endurance of Paper and board.
6. Measurement of Cobb value of Paper and board.
7. Measurement of bursting strength of Paper and board.
8. Drop Test.

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Essentials of Management (BT PPT 405A)

Course Title : Essentials of Management

Course Code : BT PPT 405A

L	T	P	Credits
3	0	0	3

Class-work Marks : 30

Exam Marks : 70

Total Marks : 100

Duration of Examination : 3 Hours

Objectives:

To understand the principles of management and their application to the functioning of an Organization.

Unit: I

Introduction To Management And Organizations: Definition of management, science or art, manager vs entrepreneur; Types of managers- managerial roles and skills; Evolution of management- scientific, human relations, system and contingency approaches; Types of Business Organizations, sole proprietorship, partnership, company, public and private enterprises; Organization culture and environment; Current trends and issues in management.

Unit: II

Planning & Organizing: Nature and purpose of Planning, Planning process, types of Planning, Objectives, Policies, Strategic Management Planning Tools and Techniques, Decision making steps & processes.

Nature and purpose of Organizing, formal and informal organization, organization structure types- line and staff authority, departmentalization, delegation of authority, centralization and decentralization,

Unit: III

HRM & Directing: Job design, human resource management, HR planning, Recruitment & selection, Training & Development, Performance Management, Career planning and Management. Directing, Foundations of individual and group behavior, motivation theories, motivational techniques, job satisfaction, job enrichment, leadership, leadership- types & theories, communication – process of communication – barrier in communication – effective communication – communication and IT.

Unit: IV

Controlling: Controlling, system and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in management control, productivity problems and management, control and performance, direct and preventive control, reporting.

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**Reference Books:**

1. Robins S.P. and Couiter M., Management, Prentice Hall India, 10th ed., 2009.
2. Stoner JAF, Freeman RE and Gilbert DR, Management, 6th ed., Pearson Education, 2004.
3. Tripathy PC & Reddy PN, Principles of Management, Tata McGraw Hill, 1999.

Course Outcomes:

- Upon completion of this course, the students will get a clear understanding of management
- Functions in an organization

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

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Printing & Packaging Materials Science-II (BT PPT 406A)

Course Title : Printing & Packaging Materials Science-II

Course Code : BT PPT 406A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about the bio-degradable materials.
- To study about printing and packaging ink.
- To study about adhesive and organic compound.

Unit: I

Printing Ink: Constituents of printing inks, general characteristics and requirement of printing ink for various printing processes, rheology, concept in ink manufacturing. Basic drying methods and their suitability for printing processes. Three and four colour process ink for different printing process. Special ink- heat set quick set, fugitive metallic, gloss, moisture set magnetic ink for UV and infrared, florescent and their suitability to different applications, improvements of various properties, testing and measurement of properties.

Unit: II

Acid, alkalis and pH: Definition of pH, pH scales and testing of pH, concentration and pH value, Buffer solution. Significance of pH control in various paper and printing. Measurement of pH using indicator, comparator and meter. Principle and concentration of digital pH meter.

Unit: III

Eco-friendly Material and Pollution Control: Bio-degradable materials, toxic materials, recycling waste treatment and cleaning agent.

Unit: IV

Adhesive, coating and organic compound: physical and chemical factors classifications. Introduction to carbon compound, diazo compounds, aromatic compounds, organic coating and varnish.

Aravind

**Reference Books:**

1. Printing Science - L C Young.
2. Printing Materials - Bob Thompson.
3. Printing Material - Prakash Shetty
4. Material for printing process by Focal Publishers.
5. Advance Science for Learning.

Course Outcomes:

- Students know about bio-degradable materials used in printing and packaging.
- Students know about constituents of printing and packaging inks.
- Students know about adhesive and organic compound and its applications.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Alamy B...



Costing, Estimating and ERP (BT PPT 407A)

Course Title : Costing, Estimating and ERP

Course Code : BT PPT 407A

L	T	P	Credits	Class-work Marks	: 30
3	0	0	3	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objective

- To study about costing system.
- To study about calculation of paper and board wastage formulas.
- To study about costing of ink and thread.

Unit: I

Brief introduction to India and Federation Costing system. Importance of costing and estimating in printing and publishing trade, definition of cost, price and profit.

Unit: II

Estimating and its inter relationship with purchasing sales and management. Importance of accurate estimating, Requirements, Qualifications and tools of an estimator. Estimating errors and their rectification, estimating on the basis of price lists, reprint work, change back system, standard catalogues, etc. Calculation of paper, board, ink covering and other finishing materials, wastage formulas. Estimating for the warehouse operations. Estimating for letter assembly, camera work, processing and planning, various methods of image carrier preparation, and machine hours for various processes of printing. Operational times and current market rates.

Unit: III

Definition, purposes and functions, aims and objects of costing, elements of cost, principles of scientific costing system. Foundations of costing system, classes of department, allocation and apportionment of expenses, basis of apportionments. Direct and indirect cost, hourly rates, recovery of elements of cost distribution of expenses. Calculation of machine hour rates. Fixed cost and variable cost, total cost and unit cost, break-even analysis- determination and graphical representation. Principles, stages, forms and specimens, costing routine.

Unit: IV

Making of estimates of complete jobs from designing to binding and finishing, original and reprint jobs, estimation and consideration for filler works, repeat works, outsource works, rush works, for new customers and contact works. Definition ERP, various factions and application in printing and packaging industry.

Arun B...

**References Books:**

1. Printer's Costing & Estimating - B. D. Mendiratta
2. Costing for the smaller Printing Business, BPIF, and London.
3. Estimating for the Printing Business, BPIF, and London. Published by Orion Publishing Group, London.
4. Printing Estimating Principles and practice by Philip Kent Rugged, California Polytechnic State University.

Course outcomes:

- Students know about costing system.
- Calculation of paper and board wastage formulas.
- Students know about costing of ink and thread.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Alexis B...



Printing & Packaging Materials Testing Lab (BT PPT 408A)

Course Title : Printing & Packaging Materials Testing Lab
Course Code : BT PPT 408A

L	T	P	Credits	Class-work Marks	: 30
0	0	2	1	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

List of Experiments:

1. Measurement of GSM of paper and paperboard.
2. Measurement of moisture of paper and paperboard.
3. Measurement of Tearing Strength of paper and paperboard.
4. Measurement of Surface Oil Absorption Test (SOAT).
5. Measurement of Gloss and Brightness of paper and paperboard.
6. Measurement of Opacity of paper and paperboard.
7. Measurement of Water absorbency of paper and paperboard.
8. Measurement of RH.

Arun B...



Printing and Packaging Materials (BT PPT 409A)

Course Title : Printing and Packaging Materials

Course Code : BT PPT 409A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

Course Objectives:

- To study about polymer materials.
- To study about printing and packaging Ink.
- To study about photographic materials, adhesive and paper substrate.

Unit: I

Fundamentals of Polymers, Classification of Polymers, Types of Polymers—Plastic, Thermoplastic, Thermosetting plastic, Rubber-natural, Synthetic rubber, Fibers, Physical, Chemical and Mechanical properties and characteristics of polymer, Metallized films.

Unit: II

Paper: Introduction, nature of paper, types of paper, Properties-physical, strength and printing properties. Adhesive-Introduction, types of adhesive and application in printing and packaging technology.

Unit: III

Photographic Materials & Aluminum foil: Introduction, base material, photographic emulsions and Light sensitive materials. AL foil-Aluminum foil, properties, application & uses in packaging.

Unit: IV

Printing and Packaging Inks and Fountain Solution: Introduction, Types of Printing Inks, Ingredients in Printing Inks-Vehicle, Pigments and Additives. Properties of Inks- Drying, Rheology and end-use properties. Fountain Solution-Introduction, Composition and functions.

Alamy B...

**Reference Books:**

1. Printing Science - L C Young.
2. Printing Materials - Bob Thompson
3. Printing Material - Prakash Shetty

Course outcomes:

- Students know about different polymers.
- Students know about component of ink and properties.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
- The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Arjun Bhandari



Indian Constitution (BT AUD 410A)

Course Title : Indian Constitution

Course Code : BT AUD 410A

L	T	P	Credits	Class-work Marks	: 30
3	1	0	4	Exam Marks	: 70
				Total Marks	: 100
				Duration of Examination	: 3 Hours

CONSTITUTION OF INDIA– BASIC FEATURES AND FUNDAMENTAL PRINCIPLES

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the “basic structure” of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of “Constitutionalism” – a modern and progressive concept historically developed by the thinkers of “liberalism” – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of “constitutionalism” in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India’s legacy of “diversity”. It has been said that Indian constitution reflects ideals of its freedom movement, however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be “static” and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950.

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it “as one of the strongest court in the world”.

Arun Bhandari



Unit: 1

1. Meaning of the constitution law and constitutionalism.
2. Historical perspective of the Constitution of India.
3. Salient features and characteristics of the Constitution of India.
4. Scheme of the fundamental rights.

Unit: 2

1. The scheme of the Fundamental Duties and its legal status.
2. The Directive Principles of State Policy – Its importance and implementation.
3. Federal structure and distribution of legislative and financial powers between the Union and the States.

Unit: 3

1. Parliamentary Form of Government in India – The constitution powers and status of the President of India
2. Amendment of the Constitutional Powers and Procedure
3. The historical perspectives of the constitutional amendments in India
4. Emergency Provisions: National Emergency, President Rule, Financial Emergency

Unit: 4

1. Local Self Government – Constitutional Scheme in India
2. Scheme of the Fundamental Right to Equality
3. Scheme of the Fundamental Right to certain Freedom under Article 19
4. Scope of the Right to Life and Personal Liberty under Article 21

Reference Books:

1. The Constitutional Law of India 9th Edition, by Pandey. J. N.
2. The Constitution of India by P.M.Bakshi
3. Constitution Law of India by Narender Kumar
4. Bare Act by P. M. Bakshi.

Note:

- The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all its sub parts), selecting one question from each unit. All questions will carry equal marks i.e. 14 marks each.
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Arun B...