Bachelor of Technology
(Printing & Packaging Technology)

B. Tech. (Printing & Packaging Technology)
4 Year Programme
(70:30 CBS Scheme)

DEPARTMENT OF PRINTING TECHNOLOGY
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR
B. TECH. (PRINTING & PACKAGING TECHNOLOGY)

SCHEME OF STUDIES & EXAMINATIONS

w.e.f. 2011-2012

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1</td>
<td>I</td>
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<td>8</td>
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<td>Total Credits</td>
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</table>

Note:
1. Students are allowed to use single memory, programmable scientific calculator during examination for all subjects in B. Tech.
2. Teacher will conduct practical in group of 20-25 students.
### B. Tech. (Printing & Packaging Technology) 2nd YEAR (3rd Semester)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>PKT301</td>
<td>Basics of Printing Processes</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT302</td>
<td>Computers in Printing &amp; Packaging</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT303</td>
<td>Fundamentals of Packaging Science</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT304</td>
<td>Introduction to Package Designing</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT305</td>
<td>Elements of Packaging</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT306</td>
<td>Theory of Machines</td>
<td>3 1 4</td>
<td>3</td>
</tr>
<tr>
<td>PKT307</td>
<td>Basics of Printing Process Lab</td>
<td>3 3 1.5</td>
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</tr>
<tr>
<td>PKT308</td>
<td>Computers in Printing &amp; Packaging Lab</td>
<td>3 3 1.5</td>
<td></td>
</tr>
<tr>
<td>PKT309</td>
<td>Package Design Lab</td>
<td>3 3 1.5</td>
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### B. Tech. (Printing & Packaging Technology) 2nd YEAR (4th Semester)

<table>
<thead>
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<th>Course No.</th>
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<th>Teaching Schedule</th>
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<tbody>
<tr>
<td>PKT401</td>
<td>Planning for Packaging Production</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT402</td>
<td>Technology of Gravure</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT403</td>
<td>Printing &amp; Packaging Materials</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT404</td>
<td>Computer Aided Composition &amp; Designing in Packaging</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT405</td>
<td>Introduction to Graphic Imaging</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT406</td>
<td>Electrical Machine &amp; its Utilization</td>
<td>3 1 4</td>
<td>3</td>
</tr>
<tr>
<td>PKT407</td>
<td>Gravure Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT408</td>
<td>Computer Aided Composition &amp; Designing in Packaging Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT409</td>
<td>Graphic Imaging Lab</td>
<td>3 3 1.5</td>
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### B. Tech. (Printing & Packaging Technology) 3rd YEAR (5th Semester)

<table>
<thead>
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<th>Course No.</th>
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<tbody>
<tr>
<td>PKT501</td>
<td>Technology of Flexography</td>
<td>3 1 4</td>
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<tr>
<td>PKT502</td>
<td>Sheet Fed Offset Technology</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT503</td>
<td>Packaging Substrates –I</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT504</td>
<td>Wood &amp; Glass Based Packaging</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT505</td>
<td>Paper &amp; Board Packaging</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT506</td>
<td>Digital Electronic Circuits</td>
<td>3 1 4</td>
<td>3.5</td>
</tr>
<tr>
<td>PKT507</td>
<td>Flexography Technology Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT508</td>
<td>Sheet Fed Offset Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT509</td>
<td>Package Substrates Testing Lab</td>
<td>3 3 1.5</td>
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<td><strong>Total</strong></td>
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### B. Tech. (Printing & Packaging Technology) 3rd YEAR (6th Semester)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Credit</th>
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<tbody>
<tr>
<td>PKT601</td>
<td>Tone &amp; Colour Analysis</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT602</td>
<td>Screen Printing</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT603</td>
<td>Digital Pre-Press</td>
<td>3 1 4</td>
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<tr>
<td>PKT604</td>
<td>Plastic &amp; Polymer Based Packaging</td>
<td>3 1 4</td>
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<tr>
<td>PKT605</td>
<td>Metal Based Packaging</td>
<td>3 1 4</td>
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<tr>
<td>PKT606</td>
<td>Packaging Substrates –II</td>
<td>3 1 4</td>
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<tr>
<td>PKT607</td>
<td>Screen Printing Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT608</td>
<td>Digital Pre-Press Lab</td>
<td>3 3 1.5</td>
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<tr>
<td>PKT609</td>
<td>Tone &amp; Colour Testing Lab</td>
<td>3 3 1.5</td>
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STUDENTS WILL UNDERGO FOUR WEEKS INDUSTRIAL TRAINING IN VACATIONS AFTER 6TH SEMESTER AND IT WILL BE EVALUATED IN 7TH SEMESTER BY A COMMITTEE DULY CONSTITUTED BY THE CHAIRMAN.
### B. Tech. (Printing & Packaging Technology) 4<sup>th</sup> YEAR (7<sup>th</sup> Semester)

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Teaching Schedule</th>
<th>Credit</th>
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<tbody>
<tr>
<td>PKT701</td>
<td>Image Carrier for Printing Processes</td>
<td>3 1 4</td>
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<tr>
<td>PKT702</td>
<td>Entrepreneurship Development</td>
<td>3 1 4</td>
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<tr>
<td>PKT703</td>
<td>Packaging Machineries</td>
<td>3 1 4</td>
<td>3.5</td>
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<tr>
<td>PKT704</td>
<td>Food &amp; Agro Based Packaging</td>
<td>3 1 4</td>
<td>3</td>
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<tr>
<td>PKT705</td>
<td>Eco-Friendly Printing &amp; Packaging</td>
<td>3 1 4</td>
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<tr>
<td>PKT706</td>
<td>Web Fed Offset Technology</td>
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<tr>
<td>PKT707</td>
<td>Image Carrier for Printing Process Lab</td>
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<tr>
<td>PKT708</td>
<td>Web Fed Offset Lab</td>
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<tr>
<td>PKT709</td>
<td>Package Testing Lab</td>
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<tr>
<td>PKT710</td>
<td>Industrial Training (4 weeks)</td>
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### B. Tech. (Printing & Packaging Technology) 4<sup>th</sup> YEAR (8<sup>th</sup> Semester)

<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>PKT801</td>
<td>Drug &amp; Cosmetics Packaging</td>
<td>3 1 4</td>
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<td>PKT802</td>
<td>Quality Control &amp; Supply Chain &amp; Logistic Management</td>
<td>3 1 4</td>
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<tr>
<td>PKT803</td>
<td>Finishing Technology</td>
<td>3 1 4</td>
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<tr>
<td>PKT804</td>
<td>Packaging &amp; Printing Inks</td>
<td>3 1 4</td>
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<tr>
<td>PKT805</td>
<td>Costing &amp; Estimating</td>
<td>3 1 4</td>
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<td>PKT806</td>
<td>Digital &amp; Advance Printing Processes</td>
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<td>PKT807</td>
<td>Quality Control Lab</td>
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<tr>
<td>PKT808</td>
<td>Finishing Lab</td>
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<td>PKT809</td>
<td>Project</td>
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Basics of Printing Processes (PKT-301)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Computers in Printing & Packaging (PKT-302)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Unit: 2

Unit: 3
Input/ Output devices - Keyboard, mouse, scanners, printers (dot matrix, ink jet, laser). Introduction to DTP, usage of computers in printing. DTP in printing technology, Style Sheet etc.

Unit: 4

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Introduction to Package Designing (PKT-304)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1
Introduction to “Graphic Design” : What is design, Graphic design, Printer’s design. Fundamentals of design: line, tone, value, weight, texture, shape, size, space, etc. Principles of design- balances, proportion, rhythm, unity, contrast, simplicity, fitness.

Unit: 2
Colour theory: dimension of colour, colour schemes, colour symbolism, and emotional effects of colour. Methods of type arrangement, classification of typeface of font designing.

Unit: 3
Printing planning: rough layout, comprehensive, artwork, type of originals, sizing, masking and cropping, perspective, scale, sense of proportion. Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, role of design in sale promotion.

Unit: 4
Design with D.T.P: Various software’s used for designing. House style, Good and bad copy, proofing stager; concept of impositions method of costing off.

Note: Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Element of Packaging (PKT-305)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Unit: 2

Unit: 3
Cushioning materials – Functions, properties. Classification – space fillers, resilient cushioning materials, non resilient cushioning materials. Introduction to Packaging Media.

Unit: 4

Note: Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Theory of Machine (PKT-306)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1
Fluctuating loads and stress concentration, reduction of stress concentration effect, Fluctuating stress, endurance limit, notch sensitivity. Cams and Followers: Types of cams and followers, analysis of motion, determination of cam profiles, followers for cams with specified contours.

Unit: 2

Unit: 3

Unit: 4
Friction: - Types of friction, laws of friction, motion along inclined plane, screw threads, efficiency on inclined plane, friction in journal bearing, friction circle and friction axis, pivots and collar friction, uniform pressure and uniform wear. Introduction to computer aided design.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Basics of Printing Process Lab (PKT-307)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Identification of different tools & equipments 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 colour printing.
8. Study of running & printing faults on different printing process machine.

Computers in Printing & Packaging Lab (PKT-308)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Introduction to computer terminologies.
2. Use of different Hardware devices.
3. Word-Processing Software.
4. DTP and its features, Software used in Printing.
5. Page set-up with different sizes and margins.
6. Preparation of Text rich documents.
7. Different kinds of Scanners, their working and uses.
8. Image and Text merging, modifications and Editing of Illustrations and Text.

Package Design Lab (PKT-309)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Folders- Single fold & Double fold.
2. Sticker- Two Colours.
3. Label designing- 2 and 4 clours.
4. Introduction to computer, various softwares's used for designing purpose Demonstration (Manipulation of same design).
5. Logo designing on computers.
6. Knowledge of different computer commands.
PLANNING FOR PACKAGING PRODUCTION (PKT-401)

Unit: 1

Introduction to design; Importance of a good design, Impact of a design in relation to various target audience, Relationship between design and sale of a product. Role and importance of graphic designer. Visual ingredients of graphic design; point, line, graphic space, shape, texture, colour, scale, balance contrast, etc. Use of computers in designing, various designing softwares. Suitability of a design for various printing techniques and printing substrates.

Unit: 2

The relationship between text, illustration and photography. Various types of images. Selection and assessment of originals. Factors to be considered for preparation of a design. Relationship of a design studio with production department of packaging. Control and checking of artwork at all stages, employment of free-lance artists, designers and photographers. The advertising agency, its structure and various services provided.

Unit: 3

Methods of preparing a design; design for books, magazines, newspapers, catalogues, cartons and FM CG products. Materials and tools used in preparing layouts and artwork. Copy preparation, casting-off and marking-up. Legibility & readability

Unit: 4

Selection and co-ordination of production processes. Consideration of composition methods. Limitations of finishing and ancillary operations affecting design. Selection and specification of ink, substrate and other materials in relation to design specifications and to the production process in printing and packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Technology of Gravure (PKT- 402)

Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Printing and Packaging Materials (PKT 403)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Unit: 2

Unit: 3
Printing Inks for Printing & Packaging Applications: Ingredients used in Printing Inks, 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. Cushioning Materials - Cushioning materials, Solid vs loose fill, Foam-in-place, Cushion curves and design, corrugated as a cushioning material, Economics of design - packaging costs vs product damage.

Unit: 4

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Unit: 1


Unit: 2


Unit: 3


Unit: 4

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, font embedding, open type fonts.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
**Introduction to Graphic Imaging (PKT-405)**

**Total Credit:** 3.5  
**Max. Marks:** 100  
**External:** 70  
**Internal:** 30  
**Time Allowed:** 3 Hrs.

**Unit: 1**

Basic principles of reproduction photography: line photography; Basic density range of line original. Basic line exposure for computerized camera with on-line densitometer, equipments and accessories. Difficult line originals. Evaluation of film elements. Halftone photography- selection of screen ruling, introduction to different halftone screens glass screen (brief study), contact screens – gray and magenta contact screen manufacture.

**Unit: 2**

Contrast control: Contrast with glass screen : contact screens, Auxiliary or supplementary exposures. Colour reproduction: The visible spectrum additive synthesis and subtractive synthesis additive and subtractive combination for graphic for reproduction and practical interpretation.

**Unit: 3**

Mechanism of vision and theories of colour-vision. Colour separation: direct & indirect.  
(a) Fake colour reproduction.  
(b) Filters- Colour separation filters and other filters: overlap in the filters. Wide band and narrow cut filters. Factors and filter ratios.

**Unit: 4**


**Note:** Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Electrical Machines & its Utilization in Printing (PKT-406)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

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, Generator 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.

Unit: 2


Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Gravure Technology (PKT- 407)

4. Pre-make and Make Ready in Gravure printing process.
5. Study of Feeding Unit of Gravure printing process.
7. Printing on Single color and multicolor on different Substrate.
8. Check the Practical problem in Gravure printing.

Computer Aided Composition & Designing in Packaging Lab (PKT-408)

1. Familiarizing with key board.
2. M.S.Word- Justification works, column work, single column, double column, fonts & type style changing, cut, copy & paste commands, wordart.
4. Introduction to Photo Shop & Corel Draw.
5. Comparing various outputs- Dot matrix, inkjet printers, laser printers, digital printers.
6. M.S. PowerPoint- Getting acquainted with presentation tools, MS Excel.
7. Multicolumn printing customized settings etc.
8. Preparation of posters, visiting cards etc.

Graphic Imaging Technology Lab – PKT-409

1. Line negative preparation.
5. Fake colour separation negative preparation.
8. Electronic scanning and manipulation.

Technology of Flexography (PKT 501)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Unit: 2

Unit: 3
Rewind equipments - surface winders, canter winders, rewind tension systems. Web guides. Printing stations - two roll, anilox roll, reverse angle doctor blade system, Deck control, Continuous inking, side and circumferential register control, Dryers. Anilox roll - construction, cell structure, anilox roll wear, selecting the night anilox roll, chrome plating. Fountain rolls - formulating rubber for rolls, Flexo roller covering. Care of covered rolls.

Unit: 4
**Note:** Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

**Sheet Fed Offset Technology (PKT-502)**

**Unit: 1**


**Unit: 2**

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: 3**

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: 4**


**Note:** Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Packaging Substrates –I (PKT-503)

Unit: 1


Unit: 2

Raw material preparation: pulping process; mechanical, chemical and semi-chemical process, screening, cleaning, and bleaching of the pulp. Stock preparation: dispersion/re-pulping, beating/refining, metering and blending, addition of non-fibrous materials. Paper and board making machines: overview of the papermaking machine. Different sections of a papermaking machine; wet end and head box, press and felt section, drying section, sizing section, and reeling section. Functions and working principles of different sections of the papermaking machine. Board making machine, its different sections, and working principles of these sections. Care and maintenance of paper and board making machine.

Unit: 3


Unit: 4

Different tests on paper: Physical properties tests and strength properties tests. Paper trouble shooting. Storage and handling of paper. Paper conditioning in the press room. Substrates other than the paper and paperboard: different substrates, their surface characteristics, and suitability to the particular printing system.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Wood and Glass Based Packaging (PKT-504)

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. 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.

Unit: 2

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.

Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Unit: 1


Unit: 2


Unit: 3


Unit: 4

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.

Note: — Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Digital Electronic Circuits (PKT-506)

Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Flexography Technology Lab. (PKT-507)

1. Introduction and familiarizing flexo machine and other related elements.
2. Preparation of rubber plates.
4. Registering and plate mounting on flexo plate cylinder.
5. Make ready procedures for a flexo machine.
6. Printing i. single color, ii. two color, iii. four color.
7. Studying of 6 color and 8 color flexomachines.

Sheet Fed Offset Lab (PKT-508)

1. Study of various controls and operations.
2. Study of the 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.
7. Two colour printing.
8. Four colour printing.

Package Substrates Testing Lab (PKT-509)

1. Study of grain direction of the substrate.
2. Study of the machine direction of the substrate.
3. Study of GSM of the substrate.
4. Study of bursting strength of the substrate.
5. Study of testing strength of the substrate.
6. Study of Light fastness of the substrate.
7. Study of Water absorbance of the substrate.
8. Study of Ash content of the substrate.

Tone & Color Analysis (PKT-601)

Unit: 1
Introduction of colour theories and its application, Detail study of colour reproduction from original to colour printing. Colour management – Introduction, WYSYG, functions of colour mgt, colour management module, principle of colour management, models of colour management, RGB, HSB & ICC.

Unit: 2

Unit: 3
Colorimeter and spectrophotometer, colour calibration, densitometry, type of densities, specular, diffuse, double difference density. Colour printing, factors in colour printing, printed colour density, trapping, tone value, UCR, GCR, colour control strips and punch register system, dot area measurement.

Unit: 4
Basic elements of scanners, principles of electronic scanning, pixels – binary resolution, AM, FM screening, basic scanner types-pantone, focal tone, true match, special/spot colour, scanner resolution, white & black point adjustment. Colour correction, need for colour correction, masking and types of masking, function of masking, brief introduction to retouching, retouching chemicals, intensification, grey balance.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Screen Printing (PKT-602)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1


Unit: 2


Unit: 3


Unit: 4

Specialized Areas – Printed circuit boards of screen printing. Screen printing process; introduction, applications of screen printing, tools, equipments & accessories used in screen printing, screen printing machines, printing operational steps, screen printing inks. Screen printing cycle, job suitability, merits and limitations of screen printing.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Digital Pre-Press (PKT-603)

Unit: 1
Digital Back, Digital camera, types, components, principles. Types of scanning advanced scanning techniques and processing method.

Unit: 2
Interactive and software packages, digital representation and manipulation of images, advanced image editing software. Electronics impositions techniques and software & used in digital printing.

Unit: 3
CTF: components, principles, features and recent advancements. CTP: components, principles, features and recent advancements.

Unit: 4
CTM: components, principles, features and recent advancements and study of different CTM machine. Different types of Lasers used in imaging for CTF, CTP, CTM and its maintenance.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Plastics and Polymer Based Packaging (PKT-604)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Metal Based Packaging (PKT-605)

Unit: 1
Manufacture of Black Plate, Tin Plate Characteristics and Properties, Tinplate, Containers. Aluminium Foil - Manufacture, Properties and Applications in Packaging.

Unit: 2

Unit: 3

Unit: 4

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Packaging Substrates –II (PKT-606)

Unit: 1

Plastic: Polyolefin like low density polyethylene, linear low density polyethylene, high density polyethylene, metallocene, cast polyethylene, Biaxially oriented polypropylene, pearlised BOPP, properties of polyolefins and application, manufacturing processes for polyolefins. Other plastic substrates such as polyamide, polystyrene, acrylonitrile buta dience styrene, polyethylene terephthalate.

Unit: 2

Wood-classification, effect of moisture on wood, preservation of wood, advantages and disadvantages of wood. Applications of wood in packaging. Glass- properties, advantages, types, basic approaches to designing a bottle, production, process of glass, tests on glass (annealing test, thermal shock test, pressure test, impact test, density test).

Unit: 3

Metals-functions, uses, cross section of in plat, tin plate, black plate. Aluminium foils Manufacturing of foil, properties, applications, method of laminating foil to film or paper. Fabric; types, various properties and uses.

Unit: 4


Note: Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Screen Printing Lab (PKT-607)

1. Study of various types of screen materials.
2. Screen stretching techniques
3. Operating of automatic machine.
5. Multi colour printing of visiting cards, greeting cards, letter heads, certificates, invitations, folders, cover pages, photographs.
7. Screen printing on Irregular Surfaces – Bottles, Ceramics, glass.

Digital Pre-Press Lab (PKT-608)

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

Tone & Colour Testing Lab (PKT-609)

1. Electronic colour separation.
2. Study of flat bed scanner.
3. Study of colour drum.
5. Study of UCR.
6. Study of GCR.
7. Study of Masking.
8. Study of colour density instruments.

Image Carrier for Printing Processes (PKT-701)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1


Unit: 2


Unit: 3


Unit: 4

Entrepreneurship Development (PKT-702)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Entrepreneurship – A Perspective: Recognition of the need for entrepreneurship and self-employment development, Entrepreneurship spirits. Significance of entrepreneur in Economic Development, Scope and trends of small entrepreneurship, Small business/enterprise-the driving force for national growth.

Unit: 2

Types of small enterprises, Economic, social and psychological need for entrepreneurship, characterization, qualities and pre-requisites of entrepreneur. Quick Start Method: life cycle of new business, selection of a potential entrepreneur, identifying & Evaluating Business opportunities.

Unit: 3


Unit: 4

Instructional Models: Govt. support to new enterprise, incentives, sources of finance. Entrepreneurship Development Centre, Role of Govt. and promotional agencies in Entrepreneurship Development. Entrepreneurship development programmes, Role of various institutions in developing entrepreneurship in India. Ways to be successful entrepreneur in field of printing and packaging. New entrepreneurship aspects.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Packaging Machineries (PKT-703)

Unit: 1

Unit: 2

Unit: 3

Unit: 4
Blow Moulding Machines: Introduction, concept, Extrusion blow moulding machine, Coextrusion blow moulding. High Flow PEs - a New Trend in Injection Moulded Containers; Plastic Packaging applications, advantages, forms, advantages of injection moulded thin all containers over thermoformed containers, Properties and benefits of PE's

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Food and Agro Based Packaging (PKT-704)

Unit: 1


Unit: 2


Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Eco-Friendly Printing & Packaging (PKT-705)

Unit: 1

Introduction: Environment, ecology and sustainable development concept. Printing and Packaging environmental aspects; environmental impacts of printing and packaging operations.

Unit: 2

Packaging wastes, effluent treatment and waste minimization. To study reuse, reduce, recycle concept related with printing and packaging.

Unit: 3

To study degradable and non degradable printing and packaging materials. Environmental impact including risk assessment, environmental legislation, Packaging effluent and its treatment.

Unit: 4

Deming Cycle, Problem Solving, Auditing i.e. Quality safety, environmental integration quality assurance practices into a production stream or packaging line. Supply/ storage/ vaporization, Awareness on-site generation, pressure swing/ membrane/ cryogenic methods, Health and Safety. Energy conservation mechanisms with printing and packaging,

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Web Offset Technology (PKT-706)

Unit: 1

Development and growth of web offset presses: Full size and mini web presses; four basic types of web offset presses specially used for newspaper and magazine production in single and multi colour. 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. Inking systems 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, causes and correction of mis-register Control of fan out, Side lay, cut-off, web-to-web and ribbon control.

Unit: 2

Auxiliary equipment: Various types of in-built and optional equipment availability for web-offset and their uses; equipment essentially needed for newspaper & magazine production. 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: 3

Dry Offset: Why dry-offset; advantages 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.

Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit.
Students will have to answer 05 questions in all, selecting at least one question from each unit.
Image Carrier for Printing Processes Lab (PKT-707)

1. Introduction and Practice of Drawing of layout and preparation of pasting for exposing.
2. Study of Tools, materials and equipments used in Offset Image generation Lab.
3. Study of Tools, materials and equipments used in Flexographic Image Generation Lab.
4. Study of tools, materials and equipments used in Gravure Image Generation Lab.
5. Preparation of various Types of Offset Plates.
6. Preparation of various Types of Flexographic Plates.
7. Preparation of various Types of Gravure Image Cylinder.
8. Quality Control equipments and their use in Image carrier department for various processes.

Web Offset Technology Lab (PKT-708)

1. Pre-make ready operations.
2. Make ready operations.
4. Study of electronic panel.
5. Blanket and plate cylinder setting.
6. Damping roller setting & Inking roller setting.
7. Study of Web-breaks.
8. Operations of Folding machine & Trouble shooting during printing.
1. Determination of Burst strength of various packaging materials
2. Determination of Crush strength of various packaging materials
3. Determination of Ply bond strength of various packaging materials
4. Determination of Stiffness of various packaging materials
5. Determination of Scuff resistance of various packaging materials
6. Determination of Heat saleability of various packaging materials
7. Determination of gloss & haze of various packaging materials
8. Measure the color of a packaging material and compute colour differences between different batches

Industrial Training (PKT-710)

REPORT OF INDUSTRIAL TRAINING WILL BE EVALUATED BY A COMMITTEE DULY CONSTITUTED BY THE CHAIRMAN
Drugs and Cosmetic Packaging (PKT-801)

Unit: 1


Unit: 2


Unit: 3


Unit: 4

Growth and development of cosmetic packaging industry in India. Modern trends in drugs & cosmetic packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
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.

Unit: 2

Materials Control: Establishing clear specifications and standardization of materials to be purchased - particularly Packaging substrates, 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.

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. 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.

Unit: 4


Note: Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Unit: 1


Unit: 2


Unit: 3


Unit: 4

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Packaging & Printing Inks (PKT-804)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Unit: 2

Unit: 3

Unit: 4
Security ink conformity tests and Q.C. teste-tests for chemical resistance, light fastnee, rub resistance test, crumpling resistance test, griding control, colour control, control of the rheological properties, control of drying time, control of various specific properties. Environmental consideration in security printing. Study light fastness of inks, factors affecting light fastness of ink, new improvements in light fastness properties of inks.

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**Note:** Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Costing & Estimating (PKT-805)

Total Credit: 3.5  
Max. Marks: 100  
External: 70  
Internal: 30  
Time Allowed: 3 Hrs.

Unit: 1

Concept of cost, Analysis of cost, fixed cost, variable cost, Elements of cost and its method of recovery. Function and 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.

Unit: 2

Job costing, its need and procedures, Cost sheet, Daily Docket, WIT and its importance in costing. Type of costing system for printing industry & related problem.

Unit: 3


Unit: 4


Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Unit: 2


Unit: 3


Unit: 4


Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.
Quality Control Lab (PKT-807)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Tensile strength, burst strength, Substance, caliper, porosity test, cobb sizing value test.
2. Tearing, brightness, gloss test, G.S.M. testing, Weight, folding endurance and other related tests.
4. Hot air oven tester, absorbing test.
5. Pick strength, humidity control test, room temp testing.
7. Investigation of pigment properties.
8. Investigation of solvent properties.

Print Finishing Lab (PKT-808)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Preparation of writing board.
2. Preparation of Photo Album.
3. Preparation of following type of Mechanical binding - Spiral wire binding, Wire ‘O’ binding, Ring binding.
4. 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.
5. Preparation of telephone directory with Indexes and Tabs.
6. Study of various controls, operations and mechanisms of the following machines: Folding machine, Guillotine machine, Cutter and Creaser, Varnishing machine, Laminating machine, Miscellaneous machines.
7. Print finishing operation to be conducted, Gold blocking, Embossing, Edge decoration,
8. Thermography, Marbling, Velvet printing, Rubber printing, Die printing, Pouch lamination.
Project (PKT-809)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30

Project will be an innovative working model of machine/equipments used in Printing & Packaging Industry with required modifications and will be demonstrated during examination with the help of project report by a group of maximum ten students under the guidance of project guide (Regular faculty member of the department).