SCHEME OF EXAMINATION

And

SYLLABI

for

BRIDGE COURSE
(Printing Technology)
LEVEL IV SKILL COMPONENT

Offered by

University School of Engineering and Technology

1st SEMESTER to 2nd SEMESTER

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY

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NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF B.VOC

1. **ET** stands for Engineering and Technology.
2. **AP** stands for Architecture and Planning
3. **V** stands for Vocation.
4. **MC** stands for Mobile Communication.
5. **SD** stands for Software Development.
6. **AE** stands for Automobile.
7. **CE** stands for Consumer Electronics.
8. **PT** stands for Printing Technology.
9. **CT** stands for Construction Technology.
10. **RA** stands for Refrigeration & Air-Conditioning.
11. **PD** stands for Power Distribution Management.
12. **ID** stands for Interior Design.
13. **AA** stands for Applied Arts.
14. **CS** stands for Computer Science.
15. **MS** stands for Management Studies.
16. **EN** stands for Environmental Engineering
17. **PH** stands for Physics
18. **AS** stands for Applied Science.
19. **HS** stands for Humanities and Social Sciences.
20. **SS** stands for Social Services.
21. **L/T** stands for Lecture and Tutorial
22. **P** stands for Practical.
23. **S/D** stands for Drawing/Studio
24. **P/D** stands for Practical/Drawing

TITLE OF THE PROGRAMME
BACHELOR OF VOCATION IN PRINTING TECHNOLOGY

Preamble:

Printing Technology has wide application in Print Media and communication, Publications, security printing, printing for packaging etc. Digital printing is also emerging technology in the current field of printing technology. It involves knowledge and several technical skills of various printing process, material science, graphic design and editing, printing machineries, print finishing etc.

Employment opportunities are available in the area of Publishing houses under central, State Govt. and in private sector, Printing Presses under Central and State govt., Commercial printing presses doing Offset, Flexography, Gravure and Screen printing, Pre-press solution for printing Industry, Designing and digital printing, Security printing presses under Govt. of India, Software solution for printing industry, Color management solution, E-publishing, Packaging and printing, Consumable like Ink, Press consumables production organizations, Print finishing and converting. There are lot of scopes in entrepreneurship in printing.

Aims &Objectives:

During their studies, students shall learn the detailed aspects of various printing processes like Offset printing, Gravure printing, Flexography, Letterpress and Screen printing including the machineries being used. Also students shall get the subject knowledge of printing material, pre-press technologies, digital printing, Security Printing, print finishing techniques, project work, business management, entrepreneurship development, cost estimation etc. Subjects on packaging technology have been included in the curriculum to impart basic knowledge of packaging technology to enable the students to apply the same in his professional career.

It involves several technical skills which hold the prime importance. Each person engaged in performing pre-press work like typesetting, graphics designing and editing, making of image carrier, press work and printing, finishing have specific and specialized role to perform and contribute for the final output.

Categories of personnel with Diploma/Advance Diploma/ B Voc Degree in Printing Technology shall have the potentiality to get employment in various positions like Shop Floor production personnel, supervisor, production manager, works manager, maintenance personnel, coordinator in publishing and advertising agencies, sales and marketing personnel etc. depending upon the level of qualification.

Program Structure:

The three year B Voc course (full time) has a specific feature of multi point entry and multi point exit provision. After completing one year of course, if any student desire to leave he/she will be awarded Diploma, subject to the condition of earning the required credit points. Similarly after completing the second year he/she will be awarded Advance Diploma and once the candidate completes the third year candidate will be awarded the degree of Bachelor in Vocational (Printing Tech). If any student desire to take admission to some other university, at any other stage i.e., on completing 1st year, he/she may take admission to 2nd year in same branch. Similarly, on completing the 2nd year, one can take admission to 3rd year.

The program is based on CBCS (Choice based credit system). There will be two semesters in each year and each semester shall have 30 plus credit. Total credit will be 186 credits for the three years and Student has to acquire minimum 180 credits for the award of degree.

Program Outcome:

On first year students shall have the knowledge of the subject on pre-press technology, offset printing process, printing material science, packaging technology with the practical aspects involved with it. On completion the first year students shall have the skill of Offset printing process and they will reach the level of Diploma in printing Tech.

On second year students shall learn the subject on digital pre-press technology, Gravure printing process, Flexographic printing process, packaging technology, Computer science applicable to printing with the practical aspects involved with it. Students shall get the Industrial Training and Project work. On completion the second year they will have the skill of Gravure printing, Flexographic printing process and will reach the level of Advance Diploma in printing Tech.

On third year students shall learn the subject on printing finishing technology, Core Elective on Auto CAD, Speciality and Security printing, mechanical maintenance, Estimating and costing Entrepreneurship with the practical aspects involved with it. Students shall get the Industrial Training and Project work. On completion the third year they will have the skill of security printing, entrepreneurship development and candidate will be awarded Bachelor in Vocational Degree in printing Tech.

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
BRIDGE COURSE FOR STUDENTS OF 10+2
(FIRST SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVPT-401		Bridge Workshop-I	0	4	4
ETVPT-403		Basics of Printing Technology-I	4	0	4
ETVPT-405		IT Workshop	0	4	4
TOTAL			**4**	**8**	**12**

No. of hours: 12 x 15 =180

Note: Only one course is to be chosen by the student out of the three choices mentioned above for the bridge course component of the first semester.

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
BRIDGE COURSE FOR STUDENTS OF 10+2
(SECOND SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVPT-402		Bridge Workshop-II	0	4	4
ETVPT-404		Basics of Printing Technology-II	4	0	4
ETVPT-406		Engineering Drawing	0	4	4
TOTAL			**4**	**8**	**12**

No. of hours: 12 x 15 =180

Note: Only one course (other than the one chosen in first semester) is to be chosen by the student out of the three choices mentioned above for the bridge course component of the second semester.

Note: The students are advised to mandatorily complete the bridge course along with LEVEL-V regular course. The credits earned are of qualifying nature and should be completed within four semesters (2 years) for obtaining Diploma/Advanced Diploma/ B.Voc Degree, as a pre-requisite. A certificate to this affect shall be issued by the Principal/Director of affiliated Institutes to be submitted to COE. NSQF LEVEL-IV certification may be done through the respective agencies involved.

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
BRIDGE COURSE FOR STUDENTS OF 10+ ITI (2 YEARS)
(FIRST SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVPT-401		Applied Physics	3	1	4
ETVPT-403		Applied Chemistry	3	1	4
ETVPT-405		IT Workshop	0	4	4
TOTAL			**6**	**6**	**12**

No. of hours: 12 x 15 =180

Note: Only one course is to be chosen by the student out of the three choices mentioned above for the bridge course component of the first semester.

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
BRIDGE COURSE FOR STUDENTS OF 10+ ITI (2 YEARS)
(SECOND SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVPT-402		Applied Mathematics	3	1	4
ETVPT-404		Engineering Drawing	0	3	3
ETVPT-406		Introduction to Printing Processes	3	2	5
TOTAL			**6**	**6**	**12**

No. of hours: 12 x 15 =180

Note: Only one course (other than the one chosen in first semester) is to be chosen by the student out of the three choices mentioned above for the bridge course component of the second semester.

Note: The students are advised to mandatorily complete the bridge course along with LEVEL-V regular course. The credits earned are of qualifying nature and should be completed within four semesters (2 years) for obtaining Diploma/Advanced Diploma/ B.Voc Degree, as a pre-requisite. A certificate to this affect shall be issued by the Principal/Director of affiliated Institutes to be submitted to COE. NSQF LEVEL-IV certification may be done through the respective agencies involved.

BRIDGE WORKSHOP-I

Paper Code: ETVPT-401 | **L** | **T/P** | **C**
Paper: Bridge Workshop-I | **0** | **4** | **4**

(60 Hrs Skill component Practical Training)

Sl	Subjects	Practical	Hrs
1	Printing process	1. Familiarization of Types, Fonts, style etc. General equipments, tools and materials used for Letterpress printing. 2. Letterpress composing 3. Printing in Letterpress machine 4. Proof reading marks 5. Imposition schemes	3 3 3 2 2
		TOTAL	**12**
2	Graphic Design	1. Layout, A/W preparation for various Printing products 2. Designing of Book cover, jacket 3. Study of colour mixing and matching.	03 03 03
		TOTAL	**9**
3	DTP	1. Use of Tools and Menus in Page Maker 2. Setting of pages in Page maker and Printing 3. Preparing pages combined with text and graphics 4. Colour page setting in Page maker 5. Designing of simple Logos and layout in Coral 6. Use of tools of Photoshop s/w 7. Simple colour corrections	3 3 3 3 3 3 3
		TOTAL	**21**
4	Reproduction photography	1. Study of tools and equipments of RP Lab 2. Study of Process camera 3. Negative and positive making 4. Halftone Negative/ Positive	3 3 6 6
		TOTAL	**18**
		GRAND TOTAL(HRS)	**60**

BASICS OF PRINTING TECHNOLOGY-I

Paper Code: ETVPT-403	**L**	**T/P**	**C**
Paper: Basics of Printing Technology-I	**4**	**0**	**4**

Objectives and Pre-requisites:*The students in this field have to deal with machines of different printing machines therefore they are required to be acquainted with relevant knowledge by imparting related instructions and requisite practical exposure is also incorporated to make the aspirants skill sound. Knowledge of basic science, visual display, printing products and publications are required as pre-requisite.*
Learning outcome: *students after attaining the above subject knowledge will be able to know the printing process, making layout, print different print products on various substrate and their recognition.*

UNIT-I
Historical background: Invention, Basic principles, Development type design, Type parts, Typefaces, Printer measurement- Point, Pica, The Em, spacing, letter spacing, line spacing, solid, copy fitting, Measuring copy, method of calculation, typesetting methods, copy preparation, making up copy.

UNIT-II
Art and production: Visual art, communication art, creativity in art, graphic communication, process to make the print work, proof reading and correction, house style, Handling production.

UNIT-III
Page layout and margin, print area and type-setting, different publications. Paper; its different types and sizes available, gsm, suitability factors for printing process, ISO paper sizes. Imposition; definition , classification and general rules, regular schemes up to 16 pages

UNIT-IV
Art work preparation and negative making. Image carriers; image carriers for printing processes, their preparation for letterpress and offset printing. Letter press printing machines and their classification,

Text Book(s):
[T1] Printing Technology by Adams, Faux and Rieber, Delmar publishers
[T2] Art and Production by N. N. Sarkar published by Sagar publishers.

I.T. WORKSHOP
(BASICS OF INFORMATION TECHNOLOGY- I)

Paper Code: ETVPT-405	**L**	**T/P**	**C**
Paper: Basics of Information Technology-I	**0**	**4**	**4**

Objectives & Prerequisites: *To study and understand the fundamentals of computer system. To learn details of hardware and software components. Proper exposure to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS Office/Open Office and internet form the broad competency profile of students. To have rigorous practice of MS word, Excel and power point tools. To use MS office tools to prepare desired assignments. Basic mathematical knowledge and willingness to excel are the basic prerequisites.*

Learning outcomes: *This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity. Being a bridge course it helps in understanding of software and CAD in the later stages of the course. Useful in preparing project reports in both academic and professional fronts.*

DETAILED CONTENTS (PRACTICAL EXERCISES)

1. To study concept and scope, applications of IT, ethics and future with information technology
2. A report on impact of computer and IT in society
3. A report on Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data, processing of data.
4. To study about Computer hardware and software; primary and secondary memory: Input devices; output devices
5. To study Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows.
6. To understand Basics of Networking – LAN, MAN,WAN
7. To Identify and list functions of various components and peripherals of given computer.
8. Installation of operating system viz. * Windows XP, *Windows 2007 etc.
9. Installing a computer system by giving connection and loading the system software and application software and various sources to install software
10. Exercises on entering text and data (Typing Practice)
11. To practice Features of Windows as an operating system:
    a) Start , shutdown and restore
    b) Creating and operating on the icons
    c) Opening, closing and resizing the windows
    d) Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file , creating and operating on a folder
    e) Introduction to all properties such as changing settings like, date, time, calculator, colour (back ground and fore ground)
    f) Using short cuts
12. Word Processing (MS Office/Open Office)- To prepare a report using various features of MS word
    a) File Management:
    b) Opening, creating and saving a document, locating files, copying contents in some different file(s)
    c) b) Editing a document:
    d) Entering text, cut, copy, paste using toolbars
    e) Use of spell check
    f) PDF file and its conversion in different file formats (MS Word/Excel etc.)
    g) Scanning, editing and printing of a document
    h) Formatting a document:
    i) Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
    j) Aligning of text in a document, justification of document ,Inserting bullets and numbering
    k) Formatting paragraph, inserting page breaks and column breaks, line spacing
    l) Use of headers, footers, inserting footnote, end note, use of comments
    m) Inserting date, time, special symbols, importing graphic images, drawing tools

n) d) Tables and Borders:
o) Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
p) How to change docx file to doc file
q) Print preview, zoom, page set up, printing options
r) Using Find, Replace options

13. Spread Sheet Processing (MS Office/Open Office) - To prepare a report using various features of MS excel
    a) Starting Excel
    b) open worksheet, enter, edit data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets
    c) Menu commands: Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs
    d) Work books: Managing workbooks (create, open, close, save, rename), working in work books
    e) Editing a worksheet: copying, moving cells, pasting, inserting, deleting cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
    f) Creating a chart: Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
    g) Using a list to organize data, sorting and filtering data in list
    h) Formulas: Addition, subtraction, division, multiplication, percentage and auto sum
    i) Introduction to PowerPoint
14. Power Point Presentation (MS Office/Open Office)- To prepare a power point presentation
    a) Introduction to PowerPoint
    b) How to start PowerPoint
    c) Working environment: concept of toolbars, slide layout, templates etc.
    d) Opening a new/existing presentation
    e) Different views for viewing slides in a presentation: normal, slide sorter etc.
    f) Addition, deletion and saving of slides
    g) Insertion of multimedia elements
    h) Adding text boxes, importing pictures, tables and charts etc.
    i) Formatting slides: Text formatting, changing slide layout, changing slide colour scheme
    j) Changing background, Applying design template
    k) How to view the slide show?
    l) Viewing the presentation using slide navigator, Slide transition
    m) Animation effects etc.

Note:
Explanation of Introductory part and theory should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

References Books:

[R1] Fundamentals of Computer by E. Balagurusamy, Tata McGraw Hill Education Pvt. Ltd, New Delhi
[R2] Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
[R3] Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
[R4] MS Office by BPB Publications, New Delhi

BRIDGE WORKSHOP-II

Paper Code: ETVPT-402 **L T/P C**
Paper: Bridge Workshop-II **0 4 4**

(60 Hrs Skill component Practical Training)

S No.	Subjects	Practical	Hrs
1	Offset Printing	1. Introduction to detailed technical specification of a sheet fed offset machines. 2. Preparation of plate surface and PS Plates, mounting of plates 3. Setting of inking and dampening rollers 4. Make-ready of press and printing	3 6 3 8
		TOTAL	**20**
2	Screen Printing	1. Study of tools, equipments, raw materials required	3
		2. Printing of Invitation cards, visiting cards etc	6
		TOTAL	**9**
3	Binding and Finishing	1. Study of binding room tools and materials, cutting machine operation 2. Practice of different folding techniques 3. Section sewing, 4. Stitching	3 3 3 3
		TOTAL	**12**
4	Packing Materials	1. Study of different paper, boards and Packing Materials	2
		2. GSM and its measurement, its application	2
		3. Grain direction find out, application	2
		4. Tackiness of ink and its significance	2
		5. Smoothness	2
		6. Dispersion of ink pigment particle	2
		7. Colour mixing of ink	2
5	Packaging Technology	8. Paper based packaging and its types	2
		9. Film/ polymer based packages	2
		TOTAL	**18**
		Grand Total(Hrs)	**60**

BASICS OF PRINTING TECHNOLOGY-II

Paper Code: ETVPT-404	**L**	**T/P**	**C**
Paper: Basics of Printing Technology-II	**4**	**0**	**4**

Objectives and Pre-requisites *The students in this field have to deal with machines of different printing machines therefore they are required to be acquainted with relevant knowledge by imparting related instructions and requisite practical exposure is also incorporated to make the aspirants skill sound. Knowledge of basic science, colour theory, visual display, printing products and publications are required as pre-requisite.*

Learning outcome: *students after attaining the above subject knowledge, will be able to know the colour theory, printing process, making layout, print different print-products on various substrate and their recognition*

UNIT-I

Colour for communication: Physical characteristics of colour, primary colour, psychological implications of colour, choosing the colour scheme.

UNIT-II

Paper based products of print finishing; Trimmed sheets, folded production, forms, news paper, sheet brochure, single layer and multi layer brochure, hard cover and mailings.

UNIT-III

Screen Printing: history, stencils; kinds and methods of preparation, screens; types and stretching, trouble shooting clogged screen, image transfer, squeegee; kinds, hardness, shape, screen ink; kinds and uses on different substrates. Introduction to printing processes, basic principles and characteristics- letterpress, flexography, offset, gravure, screen and non impact printing.

Printing machines: classification and types of letterpress, offset, gravure, flexography, parts and functions.

UNIT-IV

Basic principles of printing, characteristics, limitation, factors required for printing, all major printing processes and their job suitability. Letter press machines and their classification, modes of taking impression, Make ready and pre make ready operations, printing operation, running defects, print recognition. Use of guillotine machine for print finishing. Binding styles side stitched, centre stitched.

Text Book(s):

[T1] Art and Production By N N Sarkar published by Sugar publishers
[T2] Printing Technology By Adams, Faux and Reiber, By Delmer Publishers
[T3] Typography Today By B D Mendiratta , Asian Publishers
[T4] Screen Printing By B. D. Mendiratta

ENGINEERING DRAWING

Paper Code: ETVPT-406	**L**	**T/P**	**C**
Paper: Engineering Drawing	**0**	**4**	**4**

Objectives and Pre-requisites: *Drawing is the language of engineers & technicians. Reading & interpreting engineering drawing is their day to day responsibility. The students should have studied subjects such as Mathematics with Geometry and should have an aptitude for graphics to have an exposure about it. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings their reading & interpretation. The emphasis while imparting instruction should be to develop conceptual skills in the students.*

Learning Outcomes: *The students should be able to read engineering drawing. The students should be in a position to learn and use any of the drawing instruments for generating drawings.*

UNIT-I

General: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

Projections of Point and Lines: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-II

Planes other than the Reference Planes: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Projections of Plane Figures: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-III

Projection of Solids: Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-IV

Isometric Projection of plain surface and bodies.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

Text Book(s):

[T1] N.D. Bhatt, "Engineering Drawing", (Charotar Publications).
[T2] S. C. Sharma & Navin Kumar, "Engineering Drawing", (Galgotia Publications)

Reference Books:

[R1] Venugopalan, "Engineering Drawing", New Age International.
[R2] P. S. Gill, "Engineering Drawing", S.K. Kataria & Sons
[R3] K. C. John, "Engineering Graphics", PHI

Note:- Any 8-10 Experiments out of the list may be chosen.

APPLIED PHYSICS

Paper Code: ETVPT-401	**L**	**T/P**	**C**
Paper: Applied Physics	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied papers such as General Science, Physics & Mathematics up to secondary level. Applied physics is a foundation course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students.*

Learning Outcomes: *The students should be well verse with the concepts of Physics. The student will be able to understand the functioning of automobile and will be able to perform the measurement and testing.*

UNIT-I

Measurement

(i) **Units and Dimensions**

Fundamental and derived units, SI units, dimensions of physical quantities, dimensional formula and dimensional equation, principles of homogeneity of dimensions and applications of homogeneity principle in:

a) Checking the correctness of physical equation.
b) Deriving relations among various physical quantities.
c) Conversion of numerical values of physical quantities from one system of units into other system.

(ii) Errors in measurement accuracy, estimation of percentage error in the result of measurement.

UNIT-II

Waves

Generation of waves by vibrating particles, progressive wave, equation of waves, energy transfer by particles and waves, superposition of waves and its applications to interference, beats and stationary waves (graphical); sound and light as wave – range of frequencies, wavelengths, velocities and their nature, electromagnetic spectrum.

UNIT-III

Ultrasonic

Production of ultrasonic waves by magnetostriction and piezoelectric effect, detection and properties of ultrasonic; applications to drilling, cold welding, cleaning, flaw detection and exploration (sonar).

UNIT-IV

Radioactivity and Detection of Radiations

Natural radioactivity; half-life; decay constant; mean life; radioactive transformation. Principles of nuclear fission and fusion; energy generation. Source of background radiations; health Hazards of radiations. Units of radiation.

Text Books:

[T1] Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
[T2] A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

Reference Books

[R1] G. Aruldhas, "Engineering Physics", PHI 1st Edition, 2010.
[R2] C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
[R3] Feynman "The Feynman lectures on Physics", Pearson Volume 3 Millennium Edition, 2013
[R4] Uma Mukhrji, "Engineering Physics", Narosa, 3rd Edition, 2010.
[R5] H.K. Malik & A. K. Singh "Engineering Physics" [McGraw-Hill], 1st Edition, 2009.

APPLIED CHEMISTRY

Paper Code: ETVPT-403	**L**	**T/P**	**C**
Paper : Applied Chemistry	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective & Prerequisites *The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry*

UNIT I: Fuels

Definition, Classification & Calorific value of fuels (gross and net), Dulong's formula **(Numericals)**, Determination of calorific value of fuels using bomb's calorimeter **(Numericals)**, Determination of calorific value of fuels using Boy's Gas Calorimeter **(Numericals),** Cracking – Thermal & catalytic cracking, Octane & Cetane numbers with their significance. High & Low temperature carbonization, Manufacture of coke (Otto – Hoffmann oven) Proximate and ultimate analysis of Coal **(Numericals)** Combustion of fuels **(Numericals)**.

[T1, T2][No. of Hrs. 08]

UNIT II: The Phase Rule & Catalysis

Definition of various terms, Gibb's Phase rule & its derivation, Application of phase rule to One component system- The water system, Application of phase rule to Two component system- The Lead-Silver system (Pattinson's process).

Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Application of catalysts for industrially important processes Enzyme catalysis: Characteristics, Kinetics & Mechanism of enzyme catalyzed reaction (Michaelis-Menten equation), Acid-Base catalysis: Types, Kinetics & Mechanism, Catalysis by metals salts (Wilkinson's Catalyst), Auto-catalysis, Heterogeneous catalysis (Langmuir-Hinshelwood mechanism.

[T1, T2][No. of Hrs. 08]

UNIT III: Water

Introduction and specifications of water , Hardness and its determination by EDTA method **(Numericals)**, Alkalinity and its determination **(Numericals)**, Reverse Osmosis, Electrodialysis, Disinfection by break-point chlorination. Boiler feed water, boiler problems– scale, sludge, priming & foaming: causes & prevention, Boiler problems– caustic embrittlement & corrosion: causes & prevention, Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water Softening by External Treatment: Lime-Soda Process **(Numericals)** Zeolite & Ion-Exchange Process.

[T1, T2][No. of Hrs. 08]

UNIT IV: Corrosion & Its Control

Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemical or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Electroplating, Electro less plating, Prevention of Corrosion by Material selection & Design.

[T1, T2][No. of Hrs. 08]

Text Books:

[T1] P. C. Jain & Monika Jain, Engineering Chemistry, Latest edition, Dhanpat Rai Publishing Co., 2002.
[T2] P. Mathew, Advance Chemistry, 1 & 2 Combined Editions, Cambridge University Press, 2003.

Reference Books:

[R1] P. W. Atkins and J. De Paula, Atkins' Physical Chemistry, Oxford, 2010.
[R2] T. Engel and P. Reid, Physical Chemistry, Pearson Education, 2013.
[R3] K. Qanungo, Engineering Chemistry, PHI Learning Private Limited, New Delhi, 2009.
[R4] O. G. Palanna, Engineering Chemistry, Tata McGraw Hill Education Private Limited, 2012.
[R5] D. A. Jones, Principles and Prevention of Corrosion, Prentice Hall, 2nd Edition, 1996.
[R6] H. K. Chopra and A. Parmar, Engineering Chemistry- A Text Book, Narosa Publishing House, 2012.

[R7] S. Chawla, *Engineering Chemistry*-All India Edition, Dhanpat Rai & Co., 2003.
[R8] R. Gadi, S. Rattan and S. Mohapatra, *Environmental Studies*, S.K. Kataria & Sons, 2nd Edition 2009.

IT WORKSHOP

Paper Code: ETVPT-405	L	T/P	C
Paper: IT Workshop	0	4	4

Objectives and Pre-requisites:

Learning outcomes:

This lab is given above at page no. 9.

APPLIED MATHEMATICS

	L	T/P	C
Paper Code: ETVPT-402			
Paper: Applied Mathematics	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *The students should have studied Mathematics up to secondary level and the subject aims at developing analytical abilities in applied mathematics such as: algebra, trigonometry, numerical analysis, coordinate geometry, differential and integral calculus. Besides application of above the elements in engineering, the course of study will also provide continuing education base to them.*

Learning Outcomes: *The students should be able to apply the advance knowledge to the engineering problems. To improve their ability in solving geometrical applications of differential calculus problems. To expose to the concept of co-ordinate geometry.*

UNIT-I

Algebra:

(i) Arithmetic Progression (A.P.) – its n^{th} term, sum to n terms. Geometric Progression (G.P.) - its n^{th} term, sum to n terms. Infinite Geometric series. Partial Fractions.

(ii) Binomial theorem for positive integral index (without proof), Binomial theorem for any index, Expansions.

[T1, T2][No. of Hrs. 12]

UNIT-II

Trigonometry:

(i) Sum and difference formulas for trigonometric ratios of angles and their application (without proof). Formula from product to sum, difference and vice-versa. Ratio of multiple angles, sub multiple angles (like 2A, 3A, A/2).

(ii) In a triangle sine formulas, cosine formulas, Solution of triangle.

(iii) Simple problems on height and distance.

[T1, T2][No. of Hrs. 12]

UNIT-III

Co-ordinate Geometry:

(i) Equation of straight line in various standard forms. Intersection of two straight lines and angle between them. Concurrent lines, perpendicular distance formula.

(ii) General equation of a circle and its characteristics. Equation of a circle given center and radius, three point form and diametrical form.

[T1, T2][No. of Hrs. 12]

UNIT-IV

Differential & Integral Calculus:

(i) Functions, concept of evaluation of following limits.

$\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to 0}\frac{a^x-1}{x}$

(ii) Differential coefficient. Its physical application- As rate measure, Geometric interpretation as slope of a curve. Differentiation from first principles of functions like x^n, a^x, Log x , Sin x, Cos x and Tan x. Differentiation of sum, product and quotient of functions.

(iii) Differentiation of Trigonometric and inverse Trigonometric functions. Differentiation of function of a function, Implicit functions, parametric functions, Logarithmic differentiation.

(iv) Integration as inverse operation of differentiation. Integrals of standard functions. Integration by substitution, by parts and by partial fractions.

[T1, T2][No. of Hrs. 12]

Text Book(s):

[T1] Dr Neeraj Pant. "Engineering Mathematics", Vol-I, Vol-II, Kings India Publication, New Delhi
[T2] H K Dass, "Engineering Mathematics", S.Chand Publishers, New Delhi

References Book(s);

[R1] Grewal B.S, "Higher Engineering Mathematics", Khanna Publications, 42nd Edition, 2012.
[R2] Veerajan T, "Engineering Mathematics-I", Tata McGraw Hill Publishing Co, New Delhi, 5th Edition, 2006.
[R3] Kandasamy P et.al. "Engineering Mathematics", Vol.I (4th revised edition), S.Chand &Co., New Delhi, 2000.

ENGINEERING DRAWING
(For ITI students)

Paper Code: ETVPT-404	**L**	**T/P**	**C**
Paper: Engineering Drawing	**0**	**3**	**3**

Objectives and Pre-requisites: *Drawing is the language of engineers & technicians. Reading & interpreting engineering drawing is their day to day responsibility. The students should have studied subjects such as Mathematics with Geometry and should have an aptitude for graphics to have an exposure about it. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings their reading & interpretation. The emphasis while imparting instruction should be to develop conceptual skills in the students.*

Learning Outcomes: *The students should be able to read engineering drawing. The students should be in a position to learn and use any of the drawing instruments for generating drawings.*

UNIT-I

General: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

Projections of Point and Lines: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-II

Planes other than the Reference Planes: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Projections of Plane Figures: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-III

Projection of Solids: Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

UNIT-IV

Isometric Projection of plain surface and bodies.

[T1, T2, R1, R2, R3][No. of Hrs. 10]

Text Book(s):

[T1] N.D. Bhatt, "Engineering Drawing", (Charotar Publications).
[T2] S. C. Sharma & Navin Kumar, "Engineering Drawing", (Galgotia Publications)

Reference Books:

[R1] Venugopalan, "Engineering Drawing", New Age International.
[R2] P. S. Gill, "Engineering Drawing", S.K. Kataria & Sons
[R3] K. C. John, "Engineering Graphics", PHI

Note:- Any 8-10 Experiments out of the list may be chosen.

INTRODUCTION TO PRINTING PROCESSES

Paper Code: ETVPT-406	**L**	**T/P**	**C**
Paper: Introduction to Printing Processes	**3**	**2**	**5**

Objective and pre-requisite: *in printing industry aspirants have to deal with different machines, processes and materials. For this an in-depth knowledge and relevant skill are necessary to be imparted in the course. Through this subject principle of different processes, equipments/ machines, their defects and papers/raw material required in printing industry shall be dealt with. Relevant practical exercises are also incorporated in the subject to develop necessary vocational skills in the students. Knowledge of basic science, visual display, printing products and publications are required as pre-requisite.*

Learning outcome: *students after attaining the above subject knowledge will be able to know the printing process, making layout, print different print products on various substrate and their recognition.*

UNIT-I

1. Brief history of Printing, Historical developments of printing processes.
2. Layout preparation and Typesetting and different publications
3. Processing of Artwork/CRC for making negative positives, proofing
4. Imposition: Definition of imposition, classification, , simple regular signature imposition up to 16 pages.

UNIT-II

1. Introduction to surface preparation according to printing process, types of plates used for different printing process, brief description.
2. Introduction to printing processes, basic principles and characteristics- letterpress, flexography, offset, gravure, screen and non impact printing.
3. Printing machines: classification and types of letterpress, offset, gravure, flexography, parts and functions.

UNIT-III

1. Pre make ready and make ready on machine, Running Defects.
2. Ink and paper: Paper: general characteristics of paper, kinds of paper, sizes, gsm and their suitability factors for different printing processes. Ingredients of printing ink, types of ink and suitability with printing process.

UNIT-IV

1. Finishing operation- cutting, folding, assembling, binding and its type, other ancillary operations.
2. History of screen printing, stencils, screens, image transfer, squeegee, screen ink, trouble shooting clogged screen printing on different substrates.

Text Book(s):

[T1] Printing Technology by Adams, Faux and Rieber, Delmar publishers
[T2] Art and Production by N. N. Sarkar published by Sagar Publishers.
[T3] Screen Printing by B.D. Mendiratta

List of Practical is enclosed below:

Sl	Subjects	Practical	Hrs
1	Printing process	1. Familiarization of Types, Fonts, style etc. General equipments, tools and materials used for Letterpress printing. 2. Letterpress composing and printing Imposition	3 3
		TOTAL	**6**
2	Graphic Design	1. Layout preparation for various Printing products- Book cover, jacket	3
		TOTAL	**3**
3	DTP	1. Computer typesetting in PageMaker	3
		TOTAL	**3**
4	Reproduction Photography	1. Study of Process camera , Negative preparation	3
		TOTAL	**3**
5	Offset Printing	1. Preparation of surface plate and PS Plates, mounting of plates 2. Make-ready of press and printing	3 3
		TOTAL	**6**
6	Screen printing	1. Study of tools, equipments, raw materials required	**3**
		TOTAL	**3**
7	Print Finishing	1. Study of binding room tools and materials Operation of Cutting machine, process of Binding	3
		TOTAL	**3**
8	Printing Materials Science	1. Study of different paper and boards, GSM, Grain Direction and its measurement, application	3
		TOTAL	3
		GRAND TOTAL(HRS)	**30 Hrs**

SCHEME OF EXAMINATION

And

SYLLABI

for

BACHELOR OF VOCATION
in
PRINTING TECHNOLOGY

Offered by

University School of Engineering and Technology

1st SEMESTER to 6th SEMESTER

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY

Guru Gobind Singh Indraprastha University
Dwarka, Delhi – 110078 [INDIA]
www.ipu.ac.in

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
FIRST SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVPT-501		Fundamentals of Computer and Programming	2	0	2
ETVPT-503		Graphic Design and Reproduction	4	0	4
ETVPT-505		Offset Printing Technology	4	0	4
ETVHS-519		Communication Skills (Common to all Disciplines)	2	1	3
OPEN ELECTIVE-I (Select any one)					
ETVAS-507		Applied Mathematics	3	0	3
ETVCS-509		Data Analysis and Discrete Mathematics	3	0	3
ETVME-501		Applied Mechanics	3	0	3
ETVPT-507		**MATLAB**	**3**	**0**	**3**
GENERAL ELECTIVE-I (Select any one)					
ETVHS-513		Human Values and Professional Ethics	2	1	2
ETVHS-515		Life Skills	2	0	2
ETVHS-517		Personality Development & Behavioral Science	2	0	2
PRACTICAL/VIVA VOCE					
ETVPT-551		Fundamentals of Computer and Programming Lab	0	2	2
ETVPT-553		Graphic Design and Reproduction Lab	0	3	3
ETVPT-555		Offset Printing Technology Workshop	0	3	3
ETVPT-557		Typesetting and Publishing Lab	0	3	3
ETVCS-559		Basic Programming Lab (Common to all disciplines except MC,SD, CT)	0	2	2
ETVPT-559		Vocational Workshop-I	0	3	3
TOTAL			**17**	**15**	**32**

***Industrial Training-I:** The students are advised to undergo two weeks training either In-House or at industry/ Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) during winter vacation and should submit their training report for evaluation during the second semester.

****General Elective –II (Select any One)**: **NCC, NSS, YOGA, Sports, Community Services, ECO Club**
Note: The student can opt to take General Elective-II during the first to fifth semesters and can earn credits and /or certificate as per the requirements of the course opted for during the fifth semester. ***The camps or classes for the said programme can be held either during weekend/holidays or winter/summer vacations.*** Those students who complete General Electives-II shall be given certificate if they opt out of the programme taking Diploma/Advanced Diploma and credits will be posted in 5th Semester for B. Voc. Degree students.

Vocational Workshop: (Pre-Press Software Lab)

Note: **It is very important to decide the General Elective(s), Core Elective(s) and Open Elective(s) to be offered in the next semester well before the completion of current semester. General/Core and/or Open Elective Paper(s) will be floated, if about 50% (Not less than 1/3rd) of the total students opt for the same in each case.**

BACHELOR OF VOCATION
PRINTING TECHNOLOGY
SECOND SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVPT-502		Printing Material Science	3	1	4
ETVPT-504		Packaging Technology-I	3	1	4
ETVEN-502		Environmental Science (Common to all disciplines)	3	0	3
OPEN ELECTIVE-II (Select any one)					
ETVEC-506		Basic Electronics	3	0	3
ETVPH-502		Applied Physics	3	0	3
ETVEC-504		Digital Electronics	3	0	3
ETVEE-508		Basics of Electrical Engineering	3	0	3
ETVME-510		Engineering Materials	3	0	3
PRACTICAL/VIVA VOCE (Select any one Lab based on OPEN ELECTIVE-II)					
ETVEC-556		Basic Electronics Lab	0	2	2
ETVPH-552		Applied Physics Lab	0	2	2
ETVEC-554		Digital Electronics Lab	0	2	2
ETVEE-558		Basics of Electrical Engineering Lab	0	2	2
ETVME-560		Engineering Materials Lab	0	2	2
PRACTICAL/VIVA VOCE					
ETVPT-552		Printing Material Science Lab	0	3	3
ETVPT-554		Packaging Technology-I Lab	0	3	3
ETVEN-552		Environmental Science Lab / Field work (Common to all disciplines)	0	2	2
ETVPT-556		Project-I	0	3	3
ETVPT-558		Vocational Workshop-II (Web Offset Printing)	0	3	3
ETVPT-560		Industrial Training-I*	0	2	2
TOTAL			**12**	**20**	**32**

Note for Project: The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

Vocational Workshop-II: Web Offset Printing Tech W/s

Industrial Training-II: The students are advised to undergo 6-8 weeks training in industry/ Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) during summer vacation and should submit training report for evaluation during the Third semester and credits will be posted during third semester.

FUNDAMENTAL OF COMPUTER AND PROGRAMMING

Paper Code: ETVPT-501	**L**	**T/P**	**C**
Paper: Fundamental of Computer and Programming	**2**	**0**	**2**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with applied working knowledge of computers whilst facilitating the student with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the first course on programming and does not assume any prerequisite.

UNIT-I

Five Component Model of a Computer, System and Application software (introduction) storage devices, primary (RAM, ROM, PROM, EPROM, cache) Memory and secondary (magnetic tape, hard disk, Compact disks) memory, peripheral devices, printers.

Operating Systems: DOS Internal, External commands, Windows (2000 and NT), Overview of architecture of Windows, tools and system utilities including registry, partitioning of hard disk

[T1][No. of Hrs. 08]

UNIT-II

Networking Basics: Uses of a network and Common types of networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System, Basics of programming through flow chart, Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC), Assembler, linker and loader, Structure of a simple Hello World Program in C, Overview of compilation and execution process in an IDE (preferably Code Block)

[T1, T2, R2, R4][No. of Hrs. 08]

UNIT-III

Programming using C: Pre-processor Directive, C primitive input output using get char and put char , simple I/O Function calls from library , data type in C including enumeration , arithmetic, relational and logical operations, conditional executing using if, else, switch and break .Concept of loops , for, while and do-while.

[T2, R1, R3][No of Hrs. 08]

UNIT-IV

Arrays: Arrays (one and two dimensional), 2-d arrays used in matrix computation. Concept of Sub-programming, functions. Parameter transmission schemes i.e. call by value and call by reference, Pointers, relationship between array and pointer, Argument passing using pointers Structure and unions , Strings and C string library, File Handling in C Using File Pointers, fopen( ), fclose( ), Input and Output using file pointers, Character Input and Output with Files.

[T2, R1, R3][No. of Hrs. 08]

Text Book(s):

[T1] Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007).
[T2] Forouzan Behrouz A. "Computer Science: A Structured Programming Approach Using C, Cengage Learning 2/Ed.

References:

[R1] R.S. Salaria "Application Programming in C", Khanna Publishers4/e
[R2] Joiner Associates Staff, Flowcharts: Plain & Simple: Learning & Application Guide, Oriel Inc
[R3] Yashwant Kanetkar "Test your C Skills", BPB Publications
[R4] http://www.codeblocks.org/

GRAPHIC DESIGN AND REPRODUCTION

	L	T/P	C
Paper Code: ETVPT-503			
Paper: Graphic Design and Reproduction	**4**	**0**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: Every printed product should be well designed before it is sent to the printer for executing the work. The print technician should have a clear perspective of the design principles involved in designing a product, as designing on the printing process is to be decided. The aim of this subject is to introduce the study of design as a decision making discipline which controls all the production aspects of printing techniques. Knowledge of Typography, colours, optical science like reflection, transmission, photographic concept, optical density, Printing processes and different printing products is required as pre-requites to study the subject.

Learning outcomes: The course covers design organization, visual studies, techniques of copy preparation, layouts and dummy for all kinds of job with aim to examine detailed design considerations and incorporate design planning to different types of products and enable the students to apply this knowledge in their professional career. Photo mechanical transfer of images and electronic image generation are the areas of much importance for a student to develop himself/herself, in making printing surfaces. The subject mainly deals with operation and handling of different equipment machinery etc used for reproduction photography technology.

UNIT-I

Design considerations. Alphabet design, alphabet categories. Type copy and art copy, manual image generation. Type measurements, copy fitting. Cropping, scaling art, tints, surprints reverses and bleeds. Basic principles of design. Design steps. Typography and design. Design terms; point, line, space, shape, mass, size, colour, tone, texture and pattern. Typeface, font, type style, family of type, spacing, unit and set width.

[T1][T2][T3][No. of Hrs. 12]

UNIT-II

Characteristics of colours.
Colour wheel and relations of colour.
Various colour schemes.
Primary, secondary and territory colours.
Production aspect of colours.
Layout of book, newspaper and magazine.
Materials for layout and paste up, paste up tools, adhesives.
Types of originals; line drawings, continuous tone, black and white, and colour originals.
Selection of printing process for different job. Possibilities and limitations of binding and finishing operations.
Planning and production.

[T1][T2][T3][No. of Hrs. 12]

UNIT-III

Process Camera
Process cameras, types, diff parts, functions
Colour temperature, Illuminants its classifications
Photographic emulsion, exposure, negative, positives
Types of origina-line, halftone

[T1][T2][T3][No. of Hrs. 09]

UNIT IV

Colour Separation

Additive & subtractive, colour principles. Colour separation, filter factor, , screen angles

Film Processing

Developers Ingredients and there functions stop bath, fixing bath, Image density.

[T1][T2][T3][No. of Hrs. 12]

Text Book(s):

[T1] Art and Production – By NN Sarkar

[T2] Printing Technology – By Adam Faux Reiber

[T3] Introduction to printing and finishing – By Hugh Speirs

Reference Book(s):

[R1] Professional prepress, printing publishing – By Frank J. Romano

[R2] Graphic reproduction photo graphic focal press London

OFFSET PRINTING TECHNOLOGY

Paper Code: ETVPT-505	**L**	**T/P**	**C**
Paper: Offset Printing Technology	**4**	**0**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective and pre-requisite*: Working in printing industry is required to deal with different offset printing machines. These machines have different operational units. Students are required to have a good knowledge and skills of operating these machines, and image carrier preparation. The subject deals with the sheet-fed offset printing machines, web offset printing machines, their operational units. Knowledge of Offset printing process, its principle, consumables are pre-requisite for the subject.*

Learning outcome*: students after attaining the above subject knowledge will be able to know the offset printing process with the skill to print on sheet fed and web fed offset machine.*

UNIT-I

1. Sheet- fed offset printing machines; Basic principle, configuration, three cylinder, five cylinder, classification, Sizes, speed, suitability of single colour, multicolour, and perfecting machine, their mechanical and operational features.
2. Sheet feeding systems; types, single sheet feeder, stream feeder, sheet controls, sheet insertion devices, registration devices.
3. Printing cylinders; plate, blanket and impression cylinders, setting, cylinder bearers, gauge rings, preparation of image carrier and mounting of it and rubber blanket on cylinders.
4. Rubber blanket; kinds, grades, structure, properties, care and storage.

UNIT-II

1. Inking system; types, Design, care/ maintenance and storage.
2. Dampening system; types, fountain solution and its purpose, different elements of conventional system.
3. Delivery system; types, chute delivery to extended delivery, elements of delivery system, setting and operational features.
4. Pre Make-ready, Make -ready and printing of single colour and multi colour jobs, make-ready book, colour sequence, colour mixing and matching.
5. Running Defects; picking, fluffing, show through, ghosting, Hickies, trapping, Mis- register, Doubling, Set off, Glazing, Static electricity, catch up, damper marks, Scuffing.

UNIT-III

1. Web offset machines; their technical specification, various configuration, blanket to blanket, four- high unit, arch type, satellite type, twin satellite, three quarter satellite, combi- satellite.
2. Infeed unit, different elements, reel stand, AGV transport, splicing, web tension control, dancer roller, auto web up.

UNIT-IV

1. Printing units, inking, RCI inking and dampening systems, contacting and non- contacting, print register and control, web control, web viewing system.
2. Dryer and chill roll, silicon applicator and folding unit, folding of web folder and folder super structure, open sheet delivery, turner bars, ancillary operations, numbering, punching, etc.
3. Safety precautions, noise protection encapsulation, automatic wash-up procedure, plate changing, ink and dampening solution supply.

Text Book(s):

[T1] Printing Technology, 3rd edition, By Adams, Faux and Rieber published by Delmer Publishers Inc. New York.

[T2] Advanced Pressmanship By Charles W Latham, Published by GATF Inc.

Scheme and Syllabi for B. Voc. (Printing Technology), w. e. f. batch 2015-16, approved in the 24th BOS of USET & AC Sub Committee Meeting of USET held on 31st July, 2015.

COMMUNICATION SKILLS
(Common to All Disciplines)

Paper Code: ETVHS-519	**L**	**T/P**	**C**
Paper: Communication Skills	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied General English up to secondary level and the subject aims at developing communication skills in writing, speaking as well as body language.*

Learning Outcomes: *The students should be able to communicate effectively to his/her superiors as well as juniors at work place in his/her professional field.*

UNIT-I

Recognizing and Understanding Communication Styles: What is Communication?, Passive Communication, Aggressive Communication, Passive-Aggressive Communication, Assertive Communication, Verbal and Non Verbal Communication, Barriers and Gateways to Communication.

[T1, T2][No. of Hrs. 08]

UNIT-II

Listening Skills: Types of Listening (theory /definition), Tips for Effective Listening Academic Listening-(lecturing), Listening to Talks and Presentations, Basics of Telephone communication

Writing Skills: Standard Business letter, Report writing, Email drafting and Etiquettes, Preparing Agenda and writing minutes for meetings, Making notes on Business conversations, Effective use of SMS, Case writing and Documentation.

[T1, T2][No. of Hrs. 12]

UNIT-III

Soft Skills: Empathy (Understanding of someone else point of view), Intrapersonal skills, Interpersonal skills, Negotiation skills, Cultural Aspects of Communication.

[T1, T2][No. of Hrs. 10]

UNIT-IV

Group Communication: The Basics of Group Dynamics, Group Interaction and Communication, How to Be Effective in Groups, Handling Miscommunication, Handling Disagreements and Conflicts, Constructive Criticism.

[T1, T2][No. of Hrs. 12]

Text Books:

[T1] Mckay, M., Davis, M. & Fanning, P.(2008). Messages: The Communication Skills Book, New Harbinger Publications

[T2] Perkins, P.S., & Brown, L. (2008). The Art and Science of Communication: Tools for effective communication in the workplace, John Wiley and Sons

Reference Books:

[R1] Krizan et al (2010). Effective Business Communication, Cengage Learning.

[R2] Scot, O. (2009). Contemporary Business Communication, Biztantra, New Delhi.

[R3] Chaney & Martin (2009). Intercultural Business Communication, Pearson Education

[R4] Penrose et al (2009). Business Communication for Managers, Cengage Learning.

APPLIED MATHEMATICS
(Open Elective-I)

Paper Code: ETVAS-507	**L**	**T/P**	**C**
Paper: Applied Mathematics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

UNIT- I

Successive differentiation: Leibnitz theorem for n^{th} derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor's and Maclaurin's expansion(without proof) of function (e^x, log(1+x), cos x , sin x) with remainder terms ,Taylor's and Maclaurin's series, Error and approximation.

[T1], [T2][No. of hrs. 12]

UNIT- II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves. Integration: integration using reduction formula for $\int_0^{\frac{\pi}{2}} sin^n\theta\, d\theta$, $\int_0^{\frac{\pi}{2}} cos^n\theta d\theta$, $\int_0^{\frac{\pi}{2}} sin^n\theta cos^m\theta d\theta$. Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

[T1], [T2][No. of hrs. 12]

UNIT- III

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations . Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

[T1], [T2][No. of hrs. 12]

UNIT-IV

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations , Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

[T1], [T2][No. of hrs. 12]

Text:

[T1] B. S. Grewal, "Higher Engineering Mathematics", Khanna Publications.
[T2] R. K. Jain and S.R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publications.

References:

[R1] E. Kresyzig, "Advance Engineering Mathematics", Wiley publications
[R2] G. Hadley, "Linear Algebra", Narosa Publication
[R3] N.M. Kapoor, "A Text Book of Differential Equations", Pitambar Publication.
[R4] Wylie R, "Advance Engineering Mathematics", Tata McGraw-Hill
[R5] Schaum's Outline on Linear Algebra, Tata McGraw-Hill
[R6] Polking and Arnold, "Ordinary Differential Equation using MATLAB", Pearson.

DATA ANALYSIS AND DISCRETE MATHEMATICS
(Open Elective-I)

Paper Code: ETVCS-509	**L**	**T/P**	**C**
Paper: Data Analysis and Discrete Mathematics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: *To understand the basics concepts of Discrete Mathematical Structures. To get the Knowledge about sets, relations and functions, basics of lattices and graphs. To get familiar with propositional logic.*

UNIT-I

Overview of Data analysis Techniques: Simple Linear Regression Analysis, Multiple Linear Regression Model, Multi-Collinearity, Variable selection and Model Building, Logistic Regression Models

[T3] [No. of Hrs: 11]

UNIT-II

Sets: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

Relations and Functions: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.

[T1][T2] [No. of Hrs: 11]

UNIT-III

Partial Order Relations And Lattices: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

[T1][T2] [No. of Hrs: 11]

UNIT-IV

Graphs: Types and operations (bipartite graph. Subgraph, distance of a graph, cut-edges & cut vertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidence matrices, path circuit (Floyd's and Warshall algorithms), hamiltonian graph, graph colouring.

[T1][T2] [No. of Hrs: 12]

UNIT-IV

[T1][T2] [No. of Hrs: 11]

Text Book(s):

[T1] Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill, (2006) 6 th ed.
[T2] Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
[T3] Regression Analysis by Example by Samprit Chatterjee, Wiley

Reference Book(s):

[R1] S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000.
[R2] Tremblay, J.P. and Manohar, R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, (2007).

APPLIED MECHANICS
(Open Elective-I)

Paper Code: ETVME-501	**L**	**T/P**	**C**
Paper: Applied Mechanics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required to the students for further understanding of other applied subjects. To introduce the concepts of rigid body mechanics for bodies at rest and in motion to students. To make the students appreciate the applications of basic laws of physics to a variety of problems. Inculcating and enhancing analytical skills to solve numerical problems. Upon the completion of course student should be able to understand the importance of mechanics in engineering and various concepts.

Learning outcomes: Students will be able to state the relevant laws and apply them to numerical problems. Students will be able to draw free-body diagrams for a given problem and get the required solution. Students will be able to visualize the applications of basic laws in solving numerical problems. Students will be able to correlate the concepts learnt in the relevant courses of higher classes.

UNIT-I:
Introduction- Concept of mechanics and applied mechanics – Explanation of mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject.
Laws of Forces- Force and its effects. Units and measurement of force. Characteristics of force vector representation. Bow's notation. Types of forces, action and reaction, tension & thrust. Force systems: Coplanar and space force systems. Coplanar, concurrent and non -concurrent forces. Free body diagrams. Resultant and components of forces, concept of equilibrium; parallelogram law of forces. Equilibrium of two forces, super-position and transmissibility of forces, Newton's third law, triangle law of forces, different cases of concurrent coplanar, two forces systems, extension of parallelogram law and triangle law to many forces acting at one point-polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.

[T1, T2, T3][No. of Hrs: 11]

UNIT-II:
Moments- Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism. Parallel forces, like and unlike parallel forces, calculation of their resultant, concept of couple, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibrium of bodies under coplanar parallel forces.
Friction- Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction and rolling friction, inclined plane.

[T1, T2, T3][No. of Hrs: 11]

UNIT-III:
Centre of Gravity and Centroid- Concept of gravity, gravitational force, Centroid and centre of gravity. Centroid for regular lamina and center of gravity for regular solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies and areas with portions removed.
Moment of Inertia of Plane Areas- Concept of Moment of Inertia and second moment of area and Radius of gyration, theorems of parallel and perpendicular axes, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections. Section modulus without derivation.

[T1, T2, T3][No. of Hrs: 12]

UNIT-IV
Laws of Motion- Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with

string, Newton's third law of motion numerical problems, conservation of momentum, impulse and impulsive force (definition only).

Simple Lifting Machines- Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine, their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

[T1, T2, T3][No. of Hours: 10]

Text Book(s):

[T1] A.K.Tayal, "Engineering Mechanics: Statics and Dynamics", Umesh publications
[T2] R.K. Rajput, "Applied Mechanics", Lakshmi Publications
[T3] A. K. Upadhyay, "Applied Mechanics, Kataria Publications

References Book(s):

[R1] Beer and Johnston, "Mechanics for Engineers (Statics and Dynamics)", McGraw Hill Co. Ltd.
[R2] R. S. Khurmi, "Applied Mechanics", S. Chand publications
[R3] Hibbeler R C, "Engineering Mechanics: Statics, Low Price Edition", Pearson Education
[R4] Hibbeler R C, "Engineering Mechanics: Dynamics, Low Price Edition", Pearson Education
[R5] Timoshenko, S.P., and Young, D.H., "Engineering Mechanics", McGraw Hill international
[R6] V.S. Mokashi, "Engineering Mechanics Vol. I and II", Tata McGraw Hill Publishing Co. ltd., New

MATLAB
(Open Elective-I)

Paper Code: ETVPT-507	**L**	**T/P**	**C**
Paper: MATLAB	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites:

1. Introduction, Basics of MATLAB, Overview of features and work space
2. Data types , Problem Solving overview , Writing pseudo code, reading documentation
3. Arrays, Initialization and definition, Array functions, Multidimensional Arrays, Processing Array elements
4. Matrices, Matrix Operations, Matrix Functions, Manipulating matrices
5. Controls, Decision Making using If Else, Decision Making using Switch
6. Boolean Operators
7. Functions, Function definitions, Function arguments, Embedded Functions
8. Reading
9. Files and I/O, Reading from a file, Writing to a file, Formatting output
10. Loops, For Loop, While Loop, Do While Loop
11. Plots and Graphs, Plot Types, Plot formatting, Multiple plots
12. Data Manipulation, Plot Fits, Extrapolation and regression
13. Differential Equations, Introduction to DE's, Solving DE's
14. Linear Algebra, Introduction to Linear Algebra, Solving basic Matrix equations

HUMAN VALUES & PROFESSIONAL ETHICS
(General Elective-I)

Paper Code: ETVHS-513	**L**	**T/P**	**C**
Paper : Human Values & Professional Ethics	**2**	**1**	**2**

Non-University Examination Scheme (NUES)
Note: There will be no End-Term External University Examination. Marks are to be given on the basis of two internal sessional test of 30 marks each and one final Viva-voce project report Examination of 40 marks.

Objectives:

This introductory course input is intended

a. *To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.*
b. *To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.*
c. *To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.*

UNIT-1: Introduction to Value Education

1. Understanding the need, basic guidelines, content and process for value education.
2. Basic Human Aspirations: Prosperity and happiness
3. Methods to fulfil the human aspirations – understanding and living in harmony at various levels.
4. Practice Session – 1.

[T1], [R1], [R4][No. of Hrs. 07]

UNIT-2: Harmony in the Human Being

1. Co-existence of the sentient "I" and the material body–understanding their needs–Happiness & Conveniences.
2. Understanding the Harmony of "I" with the body–Correct appraisal of physical needs and the meaning of prosperity.
3. Programme to ensure harmony of "I" and Body-Mental and Physical health and happiness.
4. Harmony in family and society: Understanding Human-human relationship in terms of mutual trust and respect.
5. Understanding society and nation as extensions of family and society respectively.
6. Practice Session – 02

[T2], [R1],[R2][No. of Hrs. 08]

UNIT-3: Basics of Professional Ethics

1. **Ethical Human Conduct** – based on acceptance of basic human values.
2. **Humanistic Constitution and universal human order** – skills, sincerity and fidelity.
3. **To identify the scope and characteristics of people** – friendly and eco-friendly production system, Technologies and management systems.
4. Practice Session – 03.

[T1],[R4]][No. of Hrs. 07]

UNIT-4: Professional Ethics in practice

1. **Profession and Professionalism** – Professional Accountability, Roles of a professional, Ethics and image of profession.
2. **Engineering Profession and Ethics** - Technology and society, Ethical obligations of Engineering professionals, Roles of Engineers in industry, society, nation and the world.
3. **Professional Responsibilities –** Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle Blowing
4. Practice Session – 04

[T1], [T2], [T3], [R3][No. of Hrs. 08]

Text Books:

[T1] Professional Ethics, R. Subramanian, Oxford University Press.
[T2] Professional Ethics & Human Values: Subhash Bhalchandra Gogate, Vikas publication
[T3] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.
[T4] Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi.

References:

Scheme and Syllabi for B. Voc. (Printing Technology), w. e. f. batch 2015-16, approved in the 24th BOS of USET & AC Sub Committee Meeting of USET held on 31st July, 2015.

[R1] Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMARTstudent.
[R2] Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland Schinzinger, School of Engineering, University of California, Irvine.
[R3] Human Values: A. N. Tripathy (2003, New Age International Publishers)
[R4] Value Education website, http.//www.universalhumanvalues.info[16]
[R5] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
[R6] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers‟ Manual by the same author.

***PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS** will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi.)

CONTENT OF PRACTICE SESSION

Module 1: Course Introduction – Needs, Basic Guidelines, Content and Process of Value Education

PS-1: Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcoming in your life? Observe and analyze them.

Expected Outcome:
The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

PS-2: Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?
On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

Expected Outcome:
The students start finding out that technical education with study of human values can generate more solutions than problems They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

PS-3:1.Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:
a)What is naturally acceptable to you in relationship – feeling of respect or disrespect?
b)What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?
2.Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

Expected Outcome:

1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
2. The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring

relationship and not being aware that right understanding is the most important requirement for any human being.

Module 2: Understanding harmony in human being – Harmony in myself!

PS-4: Prepare the list of your desires. Observe whether the desires. Observe whether the desires are related with self "I" or body. If it appears to be related with the both, see which part of it is related to self "I" and which part is related to body.

Expected Outcome:
The students are able to see that they can enlist their desires and the desires are not vague, also they are able to relate their desires to "I" and "body" distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to "I" while the physical facility is related to the body. They are also able to see that "I" and "body" are two realities, and most of their desires are related to "I" and not with the "Body"; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of "I" too.

PS-5:

1. {A}. Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful – unnecessary & tasteful – unnecessary & tasteless.
   {B}. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
2. List Down all your activities. Observe whether the activity is of "I" or of "body" or with the participation both "I" and "body".
3. Observe the activities with "I". Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

Expected Outcome:

1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable eve for a single moment.
2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of "I" only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of "I", while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both "I" and "body"
3. The students become aware of their activities of "I" and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.

PS-6: 1.Chalk out the program to ensure that you are responsible to your body – for the nurturing, protection and right utilization of the body.
2.Find out the plants and shrubs growing in and your campus. Find out their use for curing different diseases.

Expected Outcome:
The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

Module 3: Understanding harmony in the family and society - Harmony in Human – Human relationship

PS-7: Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

S.No.	Intention (Natural Acceptance)	S.No.	Competence
1.a.	Do I want to make myself happy?	**1.b.**	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	**2.b.**	Am I liable to make the other always happy?
3.a.	Does the other want to make him happy?	**3.b.**	Is the other able to make him always happy?
4.a.	Does the other want to make me happy? What is answer?	**4.b.**	Is the other able to make me always happy? What is answer?

Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

Expected Outcome:
The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking. We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other's intention as a result we conclude that I am a good person and other is a bad person.

PS-8:
1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation.
2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

Expected Outcome:
The students are able to see that respect is right evaluation and only right evaluation leads to fulfilment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.
All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

PS-9:
1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child. Evaluate it in a group.
2. Develop three chapters to introduce "social science", its needs, scope and content in the primary education of children.

Expected Outcome:
The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4: Understanding harmony in the nature and existence – Whole existence as Co – existence -

PS-10: Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

Expected Outcome:
The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

PS-11:
1. Make a chart for the whole existence. List down different courses of studies and relate them

to different or levels in the existence.

2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

Expected Outcome:
The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

PS-12: Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

Expected Outcome:
The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

PS-13:
1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.
2. Suggest one format of humanistic constitution at the level of nation from your side.

Expected Outcome:
The students are able to grasp the right utilization of their knowledge in their streams of technology / engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-

- Thoughts
- Behavior
- Work and
- Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

Expected Outcome:
The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.

LIFE SKILLS)
(General Elective-I)

Paper Code: ETVHS-515	**L**	**T/P**	**C**
Paper: Life Skills	**2**	**0**	**2**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.*

Learning Outcomes: *The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.*

UNIT-I

Introduction: Definition and importance of Life Skills, Livelihood Skills, Survival Skills, Life Skills Approach, Life Skills based education, Life Skills Training- Implementation Models

[T1,T2][No. of Hrs. 07]

UNIT-II

Learning and Performance, Cognitive Development, Maturation, Adult Learning, Approaches to Learning Pillars of Education and Life Skills- Four Pillars: Learning to Know, Learning to Do, Learning to Live Together, Learning to be learning throughout Life

[T1,T2][No. of Hrs. 08]

UNIT-III

Social Skills and Negotiation Skills: Self Awareness, Empathy, Effective Communication, Interpersonal Relationships

Thinking Skills: Nature, Element of Thought, Types, Concept Formation, Reasoning, Creative and Critical Thinking

[T1,T2][No. of Hrs. 08]

UNIT-IV

Coping Skills: Coping with Emotions, Coping with Stress, Integrated use of thinking skills, social skills and coping skills

[T1,T2][No. of Hrs. 07]

Text Books:

[T1] Rajasenan, N.V. (2010). Life Skills, Personality and Leadership, Rajiv Gandhi National Institute of Youth Development, TamilNadu

[T2] Duffy, Grover,K., Eastwood, A. (2008). Psychology for Living-Adjustment, Growth and Behavior Today, Pearson Education

Reference Books:

[R1] Debra McGregor, (2007), "Developing Thinking; Developing Learning - A Guide to Skills in Education", Open University Press, New York, USA

[R2] Singh Madhu, (2003). "Understanding Life Skills, Background paper prepared for Education for All: The Leap to Equality"

[R3] Nair. A. Radhakrishnan, (2010). "Life Skills Training for Positive Behaviour", Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.

[R4] Dahama O.P., Bhatnagar O.P, (2005). "Education and Communication for Development, (2nd Ed.)", Oxford& IBH Publishing Co. Pvt. Ltd. New Delhi

PERSONALITY DEVELOPMENT & BEHAVIORAL SCIENCE (From USMS)
(General Elective-I)

Paper Code: ETVHS-517	**L**	**T/P**	**C**
Paper: Personality Development & Behavioral Science	**2**	**0**	**2**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.*

Learning Outcomes: *The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.*

UNIT-I

Definition and Basics of Personality, Understanding Traits and Types of Personality, Analyzing strength and weakness (SW), Body Language

[T1, T2][No. of Hrs. 07]

UNIT-II

Business Etiquettes and Public Speaking: Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

[T1, T2][No. of Hrs. 08]

UNIT-III

How to Make a Presentation, the Various Presentation Tools, along with Guidelines of Effective Presentation, Boredom Factors in Presentation and How to Overcome them, Interactive Presentation & Presentation as Part of a Job Interview, Art of Effective Listening.

Resume Writing Skills, Guidelines for a Good Resume, How to Face an Interview Board, Proper Body Posture, Importance of Gestures and Steps to Succeed in Interviews. Practice Mock Interview in Classrooms with Presentations on Self; Self Introduction – Highlighting Positive and Negative Traits and Dealing with People with Face to Face.

[T1, T2][No. of Hrs. 08]

UNIT-IV

Coping Management, Working on Attitudes: Aggressive, Assertive and Submissive Coping with Emotions, Coping with Stress

[T1, T2][No. of Hrs. 07]

Text Books:

[T1] McGraw, S. J., (2008), "Basic Managerial Skills for All, Eighth Edition", Prentice Hall of India.
[T2] The Results-Driven Manager (2005). Business Etiquette for the New Workplace: The Results-Driven Manager Series (Harvard Results Driven Manager)

Reference Books:

[R1] Pease, A. & Pease, B. (2006)., "The Definitive Book of Body Language", Bantam Books.
[R2] Scannell, E. & Rickenbacher,C. (2010)., "The Big Book of People Skills Games: Quick, Effective Activities for Making Great Impressions, Boosting Problem-Solving Skills and Improving Customer Service", Mcgraw Hill Education

FUNDAMENTALS OF COMPUTER AND PROGRAMMING LAB

Paper Code: ETVPT-551	**L**	**T/P**	**C**
Paper: Fundamentals of Computer and Programming Lab	**0**	**2**	**2**

Based on theory courses ETVPT-501 (10-12 experiments)

GRAPHIC DESIGN AND REPRODUCTION LAB

	L	T/P	C
Paper Code: ETVPT-553			
Paper: Graphic Design and Reproduction Lab	**0**	**3**	**3**

List of Experiments:

1. Collection and study of various printed products.
2. Construction of a typeface.
3. Layout preparation; interpretation of copy and layout, preparing composite layouts, rough and finished layouts.
4. Prepare layout for title page, letter head, visiting card, envelops, and greetings.
5. Designing of monograms.
6. Designing of logos, trademarks
7. Designing of Book Jacket.
8. Designing for packages
9. Study of colour mixing and matching.
10. Making of line and half tone negative & positive
11. Colour separation from reflection and transmission copy
12. Making positives by contact methods.
13. Pre-press Proofing

OFFSET PRINTING TECHNOLOGY WORKSHOP

	L	T/P	C
Paper Code: ETVPT-555			
Paper: Offset Printing Technology Workshop	**0**	**3**	**3**

List of Experiments:

1. Introduction to tools, equipments and material used in offset printing workshop.
2. Introduction to detailed technical specification of some important machines.
3. Preparation of plate,
4. Mounting and adjustment of plate and blanket on cylinder.
5. Preparation of fountain solution.
6. Setting of inking and dampening rollers,
7. Lubrication of machine.
8. Make-ready and printing of single colour job and
9. Multicolour job on multicolour machine.
10. Ink rollers wash up, dampers cleaning and storage of plates.
11. Make ready of Infeed unit of web machine and auto reel change
12. Make ready of Folding unit and adjustment
13. Make ready of web offset machine.

TYPESETTING AND PUBLISHING LAB

	L	T/P	C
Paper Code: ETVPT-557			
Paper: Typesetting and Publishing Lab	**0**	**3**	**3**

Objectives and pre-requisites: printing industry has to deal with different typesetting systems, typography involving different publications. For this an in-depth knowledge and relevant skill are necessary to be imparted. Through this subject principle of different systems, their technology in printing industry shall be dealt with. Relevant practical exercises are incorporated in the subject to develop necessary vocational skills in the students. Knowledge of typography, typesetting, basic colours, layout preparation substrate, publications, brief knowledge of printing processes is required as pre-requisite.

Learning outcome: students after attaining the above subject knowledge, will be able to typeset different printing products with the use of different systems and techniques involved.

List of Experiments:

1. Conventional Typesetting process and equipments, units of measurements
2. Computer Typesetting in Word processing software, use of various menus- character elements.
3. Typesetting routine: setting various kinds of work- text, table, display work.
4. Typesetting using Page make-up software (Page Maker) , Creating Master page with Header, footer, page insertion, change of page set-up.
5. Typesetting for various publications, its page set-up.
6. Type setting for Book publishing.
7. Text flow and text wrap, manual/computer page make-up for book, magazine etc.
8. OCR technique for typesetting
9. Display composition, Setting of coloured pages, with lines and tints,
10. Setting of geometric configuration, setting visiting card with the help of gridline, ruler setting.
11. Proof reading and marking
12. Taking final printout, use of various printers.
13. Imposition up to 32 pages (for centre stitched and section sewn) for upright and oblong pages, sheet work and half sheet work
14. Layout preparation

BASIC PROGRAMMING LAB
(Common to all Disciplines except MC, SD, CT)

Paper Code: ETVCS-559	**L**	**T/P**	**C**
Paper: Basic Programming Lab		**0**	**2**	**2**

Objectives: *In order to enable the student's use of computer effectively in problem solving, this course offers the model programming language along with exposure to various application of computer. The knowledge of C language will be reinforced by the practical exercises.*
Pre-requisites*: Basic understanding about using Computers, using computers.*

UNIT-I
Introduction of "C' language- Structure of a "C" program, some simple "C" programs, procedure to execute a "C' program. Data type, constants and variables Character sets, Identifiers and keywords, Date type constants, variables, expression, statement, symbolic constants. Operators and expressions, Arithmetic operators, Relational and logical operators, Unary Operators, Assignment operators, Conditional operators.

[T1, T2][No. of Hrs. 08]

UNIT-II
Data Input and output, Library functions, unformatted input output-getchar, putchar, gets, puts, getch and getche. Formatted input output-Scanf, printf, Control statements and loop structure,
Branching: The if-else statement,
Looping: while, do-while for. Nested control structure. Switch statement. Break. Continue, exit. Comma operator.
Jumping: go to statement,
Function: Inductions to function, need of functions, function definition, function declaration and prototype, passing arguments to function. Passing arguments by value, recursion, Arrays-Introduction to Arrays. array declaration, single and multidimensional array Examples: array order reversal, removal of duplicates from an ordered array, binary search, matrix multiplication.

[T1, T2][No. of Hrs. 08]

UNIT-III
Strings: Introduction to strings, string constants, variables, input, output of string date, standard library string function strlen (), strcat () strcpy () strcmp (),Pointers-Introduction to pointers, address operator and indirection operator, declaring and initialize pointers, pointers in parameter passing, call by reference, pointers and one dimensional array, operation on pointers and one dimensional arrays, dynamic memory location malloc, calloc, structure and unions-Introduction to structure, declaration of structure, accessing structure**,** members initialization Arrays of structure, user defined data type (typedef), Introduction to unions**.**

[T1, T2][No. of Hrs. 08]

UNIT-IV
Files-Introduction to file handling-fopen, fclose, fscanf, fprintf, getc, putc Additional feature of c: Enumerations, macro, c pre-processor**.**

[T1, T2][No. of Hrs. 06]

Text Book(s):
[T1] Byron C. Gottfried, "Programming with C", McGraw-Hill Education
[T2] Yashwant Kanetkar, "Let us C", Infinity Science Press, 2008
[T3] Moolish Cooper, "Sprit of C", Jaico Publishing House
[T4] Herbert Schildt, "Teach yourself C", Tata Mc Graw hill

Reference Books:
[R1] Stephen G. Kochan, "Programming in C", Pearson Education
[R2] Kerning & Ritchie, "C Programming Language", Prentice Hall; 2nd Edition
[R3] Balaguruswamy, "Ansi C", Tata Mc Graw Hill

List of Experiments:

1. Programming exercises on executing and editing c programs.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetical, relational operators.
4. Programming exercises on arithmetic expression and their evaluation.
5. Programming exercises on formatting input/out using printf and scanf.
6. Programming exercises using if-statement.

7. Programming exercises using if-else statement.
8. Programming exercises on switch statement.
9. Programming exercises on do-while statement.
10. Programming exercises on for statement.
11. Programs on 1 dimensional array.
12. Programs on 2 dimensional arrays.
13. Programs on strings (Copying, Concatenation, Compare, Character frequency,
14. string Length Count etc).
15. Simple programs using pointers.
16. Simple programs using structures.
17. Simple programs using files.

VOCATIONAL WORKSHOP
(PRE-PRESS SOFTWARE LAB)

Paper Code: ETVPT-559	**L**	**T/P**	**C**
Paper: Vocational Workshop	**0**	**3**	**3**

Objectives and pre-requisites: printing industry has to deal with different typesetting systems, graphic input, graphic editing, designing and output. For this an in-depth knowledge and relevant skill are necessary to be imparted. Relevant practical exercises are incorporated in the subject to develop necessary vocational skills in the students. Knowledge of software based design, editing, corrections and output of printing documents and image generation will be imparted in the subject. Knowledge of computer operation, basic IT knowledge, handling of input and output devices are required as pre-requisite to study the subject.

Learning outcome: students after attaining the above subject knowledge, will be able to use latest software based design, editing, corrections and output of printing documents and image generation.

1. **Photoshop:** Introduction, image input through Flat bed Scanner and Digital Camera pixel based images, Picture editing, colour correction, scanning the picture, converting image formats, resizing the images.
2. **CorelDraw:** Working principles, designing and practicing.
3. **MS-Word**: Justification works, column work, single column, double column, fonts & type style changing, copy & cut & paste command, Word Art.
4. **PageMaker s/w**: (page Maker, Quark):- page make up of advertisements, folders, journals, book work. Picture and text manipulation, Table work setting, tabular work setting.
5. **In Design**, **Illustrator s/w**: Designing of Poster, Book and magazine cover, preparing Ad-materials etc.
6. Various outputs –Various file format, File conversion, File transfer through media for output, Dot matrix, Inkjet printer, Laser printer, Digital printer output, Output to Image setter, CtP system.

PRINTING MATERIAL SCIENCE

Paper Code: ETVPT-502	**L**	**T/P**	**C**
Paper: Printing Material Science	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective and pre-requisite*: working in printing industry are required to deal with different printing materials like substrates-paper, polymer, foils etc. ink, consumables etc. These materials have different characteristics and properties. Students are required to have a good knowledge and skills of using these materials according to suitability and applicability. The subject deals with the materials and its science involved in testing and application. The knowledge of printing process and basic knowledge of science of secondary level will suffice the understanding.*

Learning outcome*: students after attaining the above subject knowledge will be able to know the different printing materials, its process of making, properties, characteristics, testing and suitability for particular print application.*

UNIT-I

Polymers

Monomer and Polymer, Homopolymer and Copolymers

Classification of polymer – linear, branched, cross-linked

Polymerization- Addition, Condensation and Copolymerization

Types of Polymers—Plastic, Thermoplastic, Thermosetting plastic, Rubber-natural, Vulcanized rubber, Synthetic rubber, Fibers, Physical, Chemical and Mechanical properties and characteristics of polymer

Application of polymer in printing—printing ink, resin, vehicles, adhesive, film base, cellulose, and gelatin- its Composition and characteristics.

UNIT-II

Colloids: Kinds, characteristics and properties

Colloid materials and application in printing industry Surface tension, Contact angle, capillary action

Acidity and Alkalinity: pH, pH Scale, ionic concentration and pH value

Measurement of pH using indicator, comparator, digital meter. Principle of digital meter

Significance of pH control in printing

UNIT-III

Substrates

Fibrous and non-fibrous raw material used in paper and board, their relative properties

Introduction to pulping process-Mechanical, Chemical, sheet formation in machine (Fourdrinier machine)

Fillers and loaders addition, Sizing, Calendering, coating and materials required. Paper reinforcement by Polymer addition.

Varieties of paper and board, classification and characteristics

Testing of Physical, mechanical and optical properties of paper and its significance.

Other substrate—metal foil, plastic, cellulose synthetics.

UNIT-IV

Printing ink

Constituents of printing ink, role of constituents, Manufacturing of ink- mixing and milling equipments

General characteristics and properties of printing ink-Tack, viscosity, Rheology etc.

Printing ink for various printing processes, four colour process ink

Natural drying methods and radiation curing—Infra Red, UV, Electron Beam, Microwave

Special inks: Heat set, quick set, fugitive, metallic, gloss, moisture set, magnetic, inks for ultra violet and infra red, florescent and their suitability in different applications, Eco-friendly inks,

Ink Testing.

PACKAGING TECHNOLOGY-I

Paper Code: ETVPT-504	**L**	**T/P**	**C**
Paper: Packaging Technology-I	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective and pre-requisite: Packaging is an important aspect of modern printing and packaging business. A bulk Printing is done for packaging in the Printing Industry. Printing for packaging has emerged as an area of specialization. Hence this course has been included in the curriculum to impart basic knowledge of packaging technology to enable the student to apply the same in his professional career. Knowledge of graphic design, layout preparation and printing process are pre-requisite for the subject.

Learning outcome: : students after attaining the above subject knowledge, will be able to know the basics of packaging, the properties of paper and board, paper based package production, finishing operation.

UNIT – I

1.1 Definition and function of Packaging
1.2 Packaging criteria and packaging development
1.3 Product properties influencing packaging development
1.4 Shelf life of product and packaging material
1.5 Types of packaging material and printing techniques for different materials
1.6 Theory on testing's available for paper and their significance

[T1][T2][T3][No. of Hrs. 12]

UNIT - II

2.1 Definition and History of paper
2.2 Defects of paper and their detections
2.3 Manufacturing processes for paper and board
2.4 Application of paper in packaging
2.5 Types of paper and their selection criteria

[T1][T2][T3][No. of Hrs. 10]

UNIT- III

3.1 Definition and types of folding board cartons
3.2 Relevant properties of paper board for carton
3.3 Manufacturing process and flow chart for carton
3.4 Type of laminations and special effects for ornamentation available in market
3.5 Definition of Composite containers and its application
3.6 Types of composite containers and their manufacturing process

[T1][T2][T3][No. of Hrs. 12]

UNIT – IV

4.1 Definition and types of CFB's
4.2 Board construction – Liners and Flutes
4.3 Manufacturing Joints, Coatings, Design and flute selection
4.4 Box style and their economics
4.5 Manufacturing process with diagrams
4.6 Advantages and limitations **[T1][T2][T3][No. of Hrs. 10]**

References Books:

[R1] Modern Food Packaging – By Indian Institute of Packaging
[R2] Packaging Technology Educational Volume – 1 – By Indian Institute of Packaging
[R3] Packaging Technology Educational Volume – 2 – By Indian Institute of Packaging

ENVIRONMENTAL SCIENCE
(Common to all disciplines)

Paper Code: ETVEN-502	**L**	**T/P**	**C**
Paper: Environmental Science	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites:
The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student's mind that how our environment is inter dependent on various factors and how human being must care for their natural surroundings.

UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation
(i)The Multidisciplinary Nature of Environmental Studies
Definition, scope and importance of Environmental Studies, Biotic and a biotic component of environment, need for environmental awareness.
(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, struct ures and function of the following ecosystem:
(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).
(iii) Bio-diversity and its Conservation
Introduction to biodiversity - definition: genetic, species and ecosystem diversity, Bio-geographical 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, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: *In-situ* and *ex-situ* conservation.

[T1], [R3] [No. of hrs. 12]

UNITII: Natural Resources: problems and prospects
Renewable and Non-renewable Natural Resources; Concept and definition of Natural Resources and need for their management
Forest resources: Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
Mineral resources: Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes causes by agriculture and over-grazing, 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, Urban problems related to energy, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3] [No. of hrs. 11]

UNIT III: Environmental Chemistry and Pollution Control
(i) ***Chemistry of Environment***

*(a)**Green Technology:*** Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies, clean development mechanisms (CDM), concept of environmental impact assessment,

*(b)**Eco-Friendly polymers:*** Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone,. Concept of bioremediation.

(ii) Environmental Pollution

Definition, types, 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. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.

Chemical toxicology-Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

[T1], [R3] [No. of hrs. 11]

UNIT IV: Disaster Management, Social Issues, Human Population and the Environment

(i) Disaster Management

Disaster management: floods, earthquake, cyclone and land-slides, nuclear accidents and holocaust, *case studies*.

(ii) Social Issues, Human Population and the Environment

Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, Wasteland reclamation. Population growth, problems of urbanisation, Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and
Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management, system standards-ISO 14000 series.

[T1] [No. of hrs. 11]

Text Books:

[T1] E. Barucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press (India) Pvt. Ltd., 2005.

[T2] S. Chawla, *A Textbook of Environmental Studies*, McGraw Hill Education Private Limited, 2012

References Books:

[R1] G. T. Miller, *Environmental Science*, Thomas Learning, 2012

[R2] W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.

[R3] R. Rajagopalan, *Environmental Studies*: From Crisis to Cure, 2nd Edition, Oxford University Press, 2011.

[R4] A.K. De, *Environmental Chemistry*, New Age Int. Publ. 2012,,

[R5] A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age International Publishers, 2013

[R6] Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd. New Delhi, 2010.

BASIC ELECTRONICS
(Open Elective-II)

Paper Code: ETVEC-506	**L**	**T/P**	**C**
Paper: Basic Electronics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

UNIT-I

Evaluation of Electronics: Introduction & Application Of Electronics, Energy Band Theory Of Crystals, Energy Band Structures In Metals, Semiconductors And Insulators, Theory Of Semiconductors: Classification Of Semiconductors, Conductivity Of Semiconductors, Carrier Concentration In Intrinsic & Extrinsic Semiconductors, Properties Of Intrinsic And Extrinsic Semiconductors, Variation In Semiconductors Parameters With Temperature, Fermi-Dirac Function, Fermi Level In A Semiconductor Having Impurities, Band Structure Of Open-Circuited P-N Junction, Drift And Diffusion Currents, Carrier Life Time, Continuity Equation (Elementary Treatment Only).

[T1][T2][T3][No. of Hours: 12]

UNIT – II

Theory of p-n Junction Diode: Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model,

Special Diodes: Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode,

Applications of Diodes: Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).

[T1][T2][T3][No. of Hours: 11]

Unit – III

Bipolar Junction Transistor: Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.

[T1][T2][T3][No. of Hours: 11]

Unit – IV

Application of BJT: CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

Fundamentals of Digital Electronics: Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

[T1][T2][T3][No. of Hours: 11]

Text Book(s):

[T1] S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
[T2] Millman, Halkias and Jit, "Electronic Devices and Circuits" McGraw Hill
[T3] Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10th Edition.

Reference Book(s):

[R1] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VIth Edition
[R2] Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VIIth Edition, 2006

APPLIED PHYSICS

	L	T	C
Paper Code: ETVPH-502			
Paper: Applied Physics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: *The objective of the paper is to facilitate the student with the basic understanding of Applied Physics aspects that are required for his understanding of electronics and Electromagnetics.*

UNIT-I

Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

[T1][T2](No. of Hrs. 11)

UNIT-II

Polarization: Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.

[T1][T2](No. of Hrs. 11)

UNIT-III

Electromagnetic Theory: Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equations (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

[T1][T2][No. of Hrs. 12]

UNIT-IV

Band Theory of Solids: Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

[T1][T2][No. of Hrs. 11]

Text Book(s):

[T1] Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
[T2] A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

Reference Book(s):

[R1] A. Ghatak 'Optics' , TMH, 5th Edition, 2013
[R2] G. Aruldhas 'Engineering Physics' PHI 1st Edition, 2010.
[R3] Feynman " The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013
[R4] Uma Mukhrji 'Engineering Physics' Narosa, 3rd Edition, 2010.
[R5] H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1st Edition, 2009.

DIGITAL ELECTRONICS
(Open Elective-II)

Paper Code: ETVEC-504	**L**	**T/P**	**C**
Paper: Digital Electronics	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective*: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.*

UNIT- I

Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

Switching Theory: - Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

Combinational Logic Circuits:- Review of basic gates- Universal gates, Adder, Subtractor ,Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

[T2, T3][No. of Hrs. 14]

UNIT- II

Integrated circuits: - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.

Sequential Logic Circuits: - Latches and Flip Flops- SR, D, T and MS-JK Flip Flops, Asynchronous Inputs.

Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

[T2, T3][No. of hrs. 10]

UNIT- III

Synchronous Sequential Circuits: - State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

[T1][No. of hrs. 10]

UNIT- IV

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

Fault Detection and Location: Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

[T1][No. of hrs. 10]

Text Book:

[T1] Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2nd Edition
[T2] Morris Mano, Digital Logic and Computer Design", Pearson
[T3] R.P. Jain, "Modern Digital Electronics", TMH, 2nd Ed,

Reference Books:

[R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
[R2] Taub, Helbert and Schilling, "Digital Integrated Electronics", TMH

BASICS OF ELECTRICAL ENGINEERING
(Open Elective-II)

Paper Code: ETVEE-508	**L**	**T/P**	**C**
Paper: Basics of Electrical Engineering	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: *To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.*

UNIT – I: DC Circuits

Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

[T1],[T2][No. of Hrs. 11]

UNIT – II: A.C. Circuits

A.C. Fundamentals, Phasor representation, Steady State Response of Series and Parallel R-L, R-C and R-L-C circuits using j-notation, Series and Parallel resonance of RLC Circuits, Quality factor, Bandwidth, Complex Power, Introduction to balanced 3-phase circuits with Star- Delta Connections.

[T1],[T2][No. of Hrs. 14]

UNIT – III: Measuring Instruments

Basics of measuring instruments and their types ,Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter , induction-type Energy Meter , Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

[T1],[T2],[R2][No. of Hrs. 11]

UNIT – IV: Transformer and Rotating Machines

Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor.

[T1],[T2],[R2][No. of Hrs. 12]

Text Books:

[T1] S.N Singh, "Basic Electrical Engineering" PHI India Ed 2012
[T2] Chakrabarti, Chanda,Nath "Basic Electrical Engineering" TMH India", Ed 2012.

Reference Books:

[R1] William Hayt "Engineering Circuit Analysis" TMH India Ed 2012
[R2] Giorgio Rizzoni "Principles and Application of Electrical Engineering" Fifth Edition TMH India.

ENGINEERING MATERIALS
(Open Elective-II)

Paper Code: ETVME-510	**L**	**T/P**	**C**
Paper: Engineering Materials	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: *To acquire proper knowledge about different construction materials and their applications. To have exposure about various construction materials as required in engineering. The students should learn the details of various construction materials such as stones, bricks and tiles, cement and cement based products, and lime, timber and wood based products, paint and varnishes metals and other miscellaneous materials and their applications.*
Learning outcomes: *Helps in making him as a better super visor at construction sites/ industries. Improved ability to identify and visualize various construction materials that are being used in construction and other industries. Enhanced knowledge of construction materials helps students in pursuing their careers in material testing field.* This subject helps in understanding the various subjects related to different vocational courses in later stages.

UNIT-I:
Building Stones: Classification of Rocks, Geological classification: Igneous, sedimentary and metamorphic rocks. Chemical classification: Calcareous, argillaceous and siliceous rocks. Physical classification: Un-stratified, stratified and foliated rocks; Requirements of good building stones, testing & identification of common building stones and their uses. Bricks and Tiles: Introduction to bricks, Raw materials for brick manufacturing and properties of good brick making earth, Classification of bricks as per IS: 1077, Testing of common building bricks as per IS: 3495. Compressive strength, water absorption, efflorescence test, Dimensional tolerance test. Types and use of- tiles for wall, roofing & flooring; ceramic tiles; Hollow masonry blocks; Fly ash bricks.

[T1, T2][No. of Hrs: 11]

UNIT-II:
Cement: Introduction, raw materials, manufacturing of ordinary Portland cement, flow diagram for wet and dry process. Properties and uses of ordinary Portland cement. Special cements and their uses. Storage of cement.
Lime:-Introduction: Lime as one of the cementing materials. Definition of terms; quick lime, fat lime, hydraulic lime, hydrated lime, lump lime. Calcinations and slaking of lime IS classification of lime. Definition- Properties and uses of Mortar. Types of mortar, cement & lime Mortar, Preparation of cement Mortar.

[T1, T2][No. of Hrs: 11]

UNIT III:

Timber and wood based products. Identification of different types of timber: Teak, Deodar, Shisham, Sal, Mango. Market forms of converted timber as per IS. Seasoning of timber: purpose, methods of seasoning. Defects and decay in timber, Preservation of timber and methods of treatment, Properties and specifications of structural timber. Other wood based products, their brief description of manufacture and uses: Lamina board, Black board, fiber board. Hard board and gypsum board.

[T1, T2][No. of Hrs: 10]

UNIT IV:
Purpose and use of paints, Types, ingredients, properties and uses of oil paints, water paints and Cement paints. Types, properties and uses of varnishes, Trade name of different products. Metals: - uses of ferrous and non-ferrous metals**,** Commercial forms of ferrous and non-ferrous metals. Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes. Types uses and application of-Fiber Sheets, insulating materials, Materials used in interior decoration works like POP, Water proofing compounds, fire resisting materials.

[T1, T2][No. of Hours: 12]

Text Book(s):
[T1] Surendra Singh; "Engineering Materials; "New Delhi". Vikas Publishing House Pvt. Ltd.

[T2] TTTI, Chandigarh "Civil Engineering Materials; "Tata McGraw Hill.

Reference Book(s):

[R1] M.L.Gambhir and Neha Jamwal, "Building Materials", Tata McGraw Hill.
[R2] Building Materials, P.C.Varghese, PHI Publications
[R3] Engineering materials S.C. Rangwala, Charotar Publishing House
[R4] Building Materials, Duggal, New Age Publication
[R5] Kulkarni, GJ; "Engineering Materials; "Ahmedabad, Ahmedabad Book Depot.

BASIC ELECTRONICS LAB

Paper Code: ETVEC-556	**L**	**T/P**	**C**
Paper: Basic Electronics Lab	**0**	**2**	**2**

List of Experiments:

1. Introduction to C.R.O, Function Generator& Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
2. Identification & testing of Active & passive components
3. To plot V-I characteristics of a semiconductor diode & Calculate Static & Dynamic Resistance
4. To Study the Reverse characteristics of Zener diode
5. To Study the Rectifier circuit.
   a) Half Wave Rectifier
   b) Centre Tapped Rectifier.
   c) Bridge Rectifier.
6. To Study the output waveforms of different Filter Ckts of Rectifier.
7. To Plot Input & Output characteristics CB transistor.
8. To Plot Input & Output characteristics of CE transistor.
9. Realization of basic gates.
10. Implementation of Boolean functions (two or three variables).
11. Few experiments mentioned above to be performed on P-spice.
12. To develop a working model of any electronic circuit.

Note:- Any 8-10 Experiments out of the list may be chosen.

APPLIED PHYSICS LAB

	L	T/P	C
Paper Code: ETVPH-552			
Paper: Applied Physics Lab	**0**	**2**	**2**

List of Experiments:

Instructions: *Twelve Experiments are to be chosen from the list given below and rest of the Experiments (i.e., three in number) may be designed by the faculty at the respective institute according to the Syllabus being taught.*

1. To determine the wavelength of sodium light by Newton's Rings.
2. To determine the wavelength of sodium light by Fresnel's biprism.
3. To determine the wavelength of sodium light using diffraction grating.
4. To measure small thickness of a piece of paper using Newton's Rings technique.
5. To determine the refractive index of a prism using spectrometer.
6. To determine the dispersive power of prism using spectrometer and mercury source.
7. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
8. To find the wavelength of He-Ne laser using transmission diffraction grating.
9. To determine the numeral aperture (NA) of an optical fibre.
10. To determine the e/m ratio of an electron by J.J. Thomson method.
11. To measure time period of a waveform and calculate its frequency and wavelength using CRO.
12. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
13. To determine the frequency of A.C. mains by using Sonometer .
14. To determine the frequency of electrically maintained tuning fork by Melde's method.
15. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
16. To study the charging and discharging of a capacitor and to find out the time constant.
17. To study the Hall effect.
18. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
19. To study the V-I characteristics of Zener diode.
20. To measure surface tension of different liquids using capillary rise method.
21. To measure coefficient of viscosity by Stoke's method.

Text Book(s):

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

DIGITAL ELECTRONICS LAB

Paper Code: ETVEC-554	**L**	**T/P**	**C**
Paper: Digital Electronics Lab	**3**	**0**	**3**

List of Experiments:

1. Realize all gates using NAND & NOR gates
2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
3. Realize a BCD adder
4. Realize a Serial Adder
5. Realize a four bit ALU
6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
7. Realize Universal Shift Register
8. Realize Self-Starting, Self Correcting Ring Counter
9. Realize Multiplexer and De-Multiplexer
10. Realize Carry Look ahead Adder / Priority Encoder
11. Simulation of PAL and PLA
12. Simulation Mealy and Moore State machines

BASICS OF ELECTRICAL ENGINEERING LAB

Paper Code: ETVEE-558	**L**	**T/P**	**C**
Paper: Basics of Electrical Engineering	**0**	**2**	**2**

List of Experiments:

1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view
2. Study and applications of CRO for measurement of voltage, frequency and phase of signals.
3. Connection of lamp by
   (1)Single Switch Method.(2) Two-way Switch Method.
   OR
   Performance comparison of of fluorescent Tube & CFL Lamp.
4. To Verify Thevenin's & Norton's Theorem
   OR
   To Verify Superposition &Reciprocity Theorem.
   OR
   To Verify Maximum Power Transfer Theorem.
5. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three Voltmeters.
6. To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase Wattcmeters.
7. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
8. To perform open circuit and short circuit test on 1-phase transformer.
9. Starting, Reversing and speed control of DC shunt Motor
10. Starting, Reversing and speed control of 3-phase Induction Motor
11. To Study different types of Storage Batteries & its charging system.
12. .To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

Note:- Any 8-10 Experiments out of the list may be chosen.

ENGINEERING MATERIALS LAB

Paper Code: ETVME-560	**L**	**T/P**	**C**
Paper: Engineering Materials Lab	**0**	**2**	**2**

List of Experiments:

1) To determine the crushing strength of bricks
2) To determine the water absorption of bricks.
3) To conduct field tests on cement.
4) To determine fineness (by sieve method) of cement.
5) To determine normal consistency of cement.
6) To determine initial and final setting times of cement.
7) To determine soundness of cement.
8) To determine compressive strength of cement.
9) Field visit to study different types of cements that are used in construction industry
10) Field visit to study different types of bricks that are used in construction
11) Field visit to study use of timber in construction
12) A report on use of plastic materials for various purposes in buildings
13) Field visit to study different types of tiles used in construction industry
14) Field visit to study different type of paints used in buildings
15) A report on new and latest material being used in construction industry.

Teachers are expected to physically show various materials while imparting instructions. Field visits should be organized and active participation of students shall be encouraged.

PRINTING MATERIAL SCIENCE LAB

Paper Code: ETVPT-552	L	T/P	C
Paper: Printing Material Science Lab	0	3	3

List of Experiments:

1. Measurement of GSM of Paper
2. Tensile strength,
3. Bursting strength and
4. Tearing strength of paper
5. Grain and cross grain direction test of paper
6. Surface oil absorption test of paper
7. Opacity,
8. Brightness and
9. Gloss measurement of paper
10. Viscosity,
11. Tack measurement of ink
12. Dispersion measurement of ink
13. pH measurement for fountain solution, paper

PACKAGING TECHNOLOGY-I LAB

Paper Code: ETVPT-554	**L**	**T/P**	**C**
Paper: Packaging Technology Lab	**0**	**3**	**3**

List of Experiments:

1. Thickness of paper
2. Compression Strength
3. Edge crush test
4. Flat crush test
5. Bulk density of paper
6. Ash content
7. Stiffness
8. Moisture content
9. Tensile Strength
10. Bursting Strength
11. Tearing resistance
12. Folding Endurance
13. Cobb Test

ENVIRONMENTAL SCIENCE LAB/ FIELD WORK
(Common to All Disciplines)

Paper Code: ETVEN-552	**L**	**T/P**	**C**
Paper: Environmental Science Lab/ Field Work	**0**	**2**	**2**

List of Experiments

1. Determination of pH, conductivity and turbidity in drinking water sample.
2. Determination of pH and conductivity of soil/sludge samples.
3. Determination of moisture content of soil sample.
4. Determination of Total Dissolved Solids (TDS) of water sample.
5. Determination of dissolved oxygen (DO) in the water sample.
6. Determination of Biological oxygen demand (BOD) in the water sample.
7. Determination of Chemical oxygen demand (COD) in the water sample.
8. Determination of Residual Chlorine in the water sample.
9. Determination of ammonia in the water sample.
10. Determination of carbon dioxide in the water sample.
11. Determination of nitrate ions or sulphate ions in water using spectrophotometer.
12. Determination of the molecular weight of polystyrene sample using viscometer method.
13. Base catalyzed aldol condensation by Green Methodology.
14. Acetylation of primary amines using eco-friendly method.
15. To determine the concentration of particulate matter in the ambient air using High Volume Sampler.

P.S.: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

Suggested Books:

[T1] A. I. Vogel, G. H. Jeffery, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5th Edition, 1989.

[T2] dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).

[T3] S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3rd Edition, 2008.

[T4] S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria& Sons, 2nd Edition, 2003.

[T5] W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.

[T6] A. Kaushik and C. P. Kaushik, *Perspectives in Environment Studies*, 4th Edition, New Age International Publishers, 2013.

VOCATIONAL WORKSHOP-II
(WEB OFFSET PRINTING)

	L	T/P	C
Paper Code: ETVPT-558			
Paper: Vocational Workshop-II (Web Offset Printing)	**0**	**3**	**3**

Objective and pre-requisite*: working in printing industry are required to deal with web offset printing machines for the printing of Newspaper, magazines, book printing and packaging. These machines have different operational units. Students are required to have a good knowledge and skills of operating these machines involving the setting of various units on these machines. The subject deals with the web offset printing machines, their operational units. Knowledge of Offset printing process, its principle, folding process, signatures, consumables are pre-requisite for the subject.*

Learning outcome*: students after attaining the above subject knowledge, will be able to operate and print the web offset printing press and its general upkeep.*

List of Experiments:

1. Study of detailed technical specification of important web offset machines
2. Study of tools, equipment required in work shop.
3. Cleaning and lubrication of machine.
4. Study of Web tension control and registration unit
5. Clamping of plate on plate cylinder of machine.
6. Setting of rollers of Inking and Dampening unit.
7. Mounting of reel and paper feeding up to folder unit.
8. Setting of folder for tabloid, jaw folding and chopper folding.
9. Setting of dryer chamber and chiller unit.
10. Pre make ready operations on machine.
11. Make ready operations on machine.
12. Printing and folding of newspaper.
13. Printing of Computer Stationery with suitable machine.
14. Printing and folding of book/ magazine work
15. Ink cleaning and washing of dampeners.