Program Educational Objectives:
The curriculum of Bachelors in Printing Technology is designed to prepare the graduates having knowledge and wisdom to

1. Have successful professional and technical careers in the industry that meets the needs of Indian and multinational printing, packaging and allied organizations.
2. Have strong foundation in mathematical, scientific and engineering fundamentals.
3. Understand and analyze the theory and practices in the field of printing, packaging and allied areas.
5. Practice and inspire high ethical values and technical standards.

Program Outcomes:

a) Ability to apply knowledge of mathematics, sciences and engineering.
b) Ability to design and conduct experiments, interpret and analyze data and report results.
c) Ability to identify, formulate, and solve printing and packaging technology problems.
d) Ability to understand and apply engineering software tools and equipments to analyze printing and packaging technology problems.
e) Ability to function with engineering and science laboratory teams as well as interdisciplinary groups.
f) Ability to understand ethical and professional responsibilities.
g) Ability to communicate effectively in verbal and written forms.
h) Ability to review, comprehend and report technological developments.
i) Ability to apply engineering solutions in global and social context.
j) Ability to innovate for creating new products for printing industrial development.

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YEAR 3

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|       | Web Offset Technology | ✓                     | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Print Operations Management | ✓                  | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Professional Elective - II | ✓                  | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Open Elective - II | ✓                     | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Environmental Science and Engineering | ✓                  | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Color Reproduction and Management Laboratory | ✓                  | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Package Design and Testing Laboratory | ✓                  | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |
|       | Mini Project | ✓                     | ✓                        | ✓                    | ✓                           |                               |                                                          |                                 |

**Attended**

**Director**

Centre for Academic Courses
Anna University, Chennai-600 025
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## ANNA UNIVERSITY, CHENNAI
### UNIVERSITY DEPARTMENTS
#### B.E. PRINTING TECHNOLOGY
##### REGULATIONS – 2015
##### CHOICE BASED CREDIT SYSTEM
##### CURRICULA AND SYLLABI I - VIII SEMESTERS

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# 4 Weeks of Industrial Training; 2 weeks each during the 2"nd & 3"rd year summer vacations

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TOTAL NO. OF CREDITS: 180

*Course from the curriculum of other UG Programmes

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COURSE DESCRIPTION:
This course aims at developing the language skills necessary for the first year students of Engineering and Technology.

OBJECTIVES:
- To develop the four language skills – Listening, Speaking, Reading and Writing.
- To improve the students' communicative competence in English.
- To teach students the various aspects of English language usage.

UNIT I  GREETING AND INTRODUCING ONESELF  12
Listening- Types of listening – Listening to short talks, conversations; Speaking – Speaking about one's place, important festivals etc. – Introducing oneself, one's family/ friend; Reading – Skimming a passage– Scanning for specific information; Writing- Guided writing - Free writing on any given topic (My favourite place/ Hobbies/ School life, writing about one’s leisure time activities, hometown, etc.); Grammar – Tenses (present and present continuous) -Question types - Regular and irregular verbs; Vocabulary – Synonyms and Antonyms.

UNIT II  GIVING INSTRUCTIONS AND DIRECTIONS  12
Listening – Listening and responding to instructions; Speaking – Telephone etiquette - Giving oral instructions/ Describing a process – Asking and answering questions; Reading – Reading and finding key information in a given text - Critical reading - Writing –Process description( non-technical)- Grammar – Tense (simple past& past continuous) - Use of imperatives – Subject – verb agreement – Active and passive voice; Vocabulary – Compound words – Word formation – Word expansion (root words).

UNIT III  READING AND UNDERSTANDING VISUAL MATERIAL  12
Listening- Listening to lectures/ talks and completing a task; Speaking – Role play/ Simulation – Group interaction; Reading – Reading and interpreting visual material; Writing- Jumbled sentences – Discourse markers and Cohesive devices – Essay writing (cause & effect/ narrative); Grammar – Tenses (perfect), Conditional clauses –Modal verbs; Vocabulary – Cause and effect words; Phrasal verbs in context.

UNIT IV  CRITICAL READING AND WRITING  12
Listening- Watching videos/ documentaries and responding to questions based on them; Speaking– Informal and formal conversation; Reading – Critical reading (prediction & inference); Writing– Essay writing (compare & contrast/ analytical) – Interpretation of visual materials; Grammar – Tenses (future time reference); Vocabulary – One word substitutes (with meanings) – Use of abbreviations & acronyms – Idioms in sentences.

UNIT V  LETTER WRITING AND SENDING E-MAILS  12
Listening- Listening to programmes/broadcast/ telecast/ podcast; Speaking – Giving impromptu talks, Making presentations on given topics- Discussion on the presentation; Reading – Extensive reading; Writing– Poster making – Letter writing (Formal and E-mail) ; Grammar – Direct and Indirect speech – Combining sentences using connectives; Vocabulary –Collocation;

TEACHING METHODS:
Interactive sessions for the speaking module.
Use of audio – visual aids for the various listening activities.
Contextual Grammar Teaching.

EVALUATION PATTERN:
Internals – 50%
End Semester – 50%

TOTAL:60 PERIODS
OUTCOMES:
- Students will improve their reading and writing skills
- Students will become fluent and proficient in communicative English
- Students will be able to improve their interpersonal communication

TEXTBOOK:

REFERENCES:

MA7151 MATHEMATICS – I
(1 Semester)

OBJECTIVES:
- The goal of this course is for students to gain proficiency in calculus computations.
  In calculus, we use three main tools for analyzing and describing the behavior of functions: limits, derivatives, and integrals. Students will use these tools to solve application problems in a variety of settings ranging from physics and biology to business and economics.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I DIFFERENTIAL CALCULUS
12
Representation of functions - New functions from old functions - Limit of a function - Limits at infinity - Continuity - Derivatives - Differentiation rules - Polar coordinate system - Differentiation in polar coordinates - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES
12
UNIT III INTEGRAL CALCULUS 12
Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT IV MULTIPLE INTEGRALS 12

UNIT V DIFFERENTIAL EQUATIONS 12
Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

TOTAL: 60 PERIODS

OUTCOMES:
- Understanding of the ideas of limits and continuity and an ability to calculate with them and apply them.
- Improved facility in algebraic manipulation.
- Fluency in differentiation.
- Fluency in integration using standard methods, including the ability to find an appropriate method for a given integral.
- Understanding the ideas of differential equations and facility in solving simple standard examples.

TEXTBOOKS:

REFERENCES:
PH7151  ENGINEERING PHYSICS  L T P C
(Common to all branches of B.E / B.Tech programmes)  3 0 0 3

OBJECTIVE:
- To introduce the concept and different ways to determine moduli of elasticity and applications.
- To instill the concept of sound, reverberation, noise cancellation, and ultrasonic generation, detection and applications.
- To inculcate an idea of thermal properties of materials, heat flow through materials and quantum physics.
- To promote the basic understanding of interferometers, principles and applications of lasers, optical fibers and sensors.
- To establish a sound grasp of knowledge on the basics, significance and growth of single crystals.

UNIT I  PROPERTIES OF MATTER  9

UNIT II  ACOUSTICS AND ULTRASONICS  9

UNIT III  THERMAL AND MODERN PHYSICS  9

UNIT IV  APPLIED OPTICS  9

UNIT V  CRYSTAL PHYSICS  9
Single crystalline, polycrystalline and amorphous materials – Single crystals: unit cell, crystal systems, Bravais lattices, deictions and planes in a crystal, Miller indices - interplanar distance for a cubic crystal - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - structure and significance of NaCl, CsCl, ZnS and graphite - crystal imperfections: point defects, line defects – Burger vectors, dislocations and stacking faults – Growth of single crystals: Bridgman and Czochralski methods.

TOTAL: 45 PERIODS
OUTCOME:
- The students will understand different moduli of elasticity, their determination and applications.
- The students will gain knowledge on the properties of sound, noise cancellation, and production, detection and applications of ultrasonics.
- The students will acquire sound knowledge on thermal expansion and thermal conductivity of materials. Further they will gain an idea of quantum physics.
- The students will gain knowledge on interferometers, lasers and fiber optics.
- The students will secure knowledge on the basics of crystal structures and their significance. Further they gain basic ideas of growing single crystals.

TEXTBOOKS:

REFERENCES:

OBJECTIVE
- To develop an understanding about fundamentals of polymer chemistry.
- Brief elucidation on surface chemistry and catalysis.
- To develop sound knowledge photochemistry and spectroscopy.
- To impart basic knowledge on chemical thermodynamics.
- To understand the basic concepts of nano chemistry.

UNIT I POLYMER CHEMISTRY
Introduction: Functionality-degree of polymerization. Classification of polymers- natural and synthetic, thermoplastic and thermosetting. Types and mechanism of polymerization: addition (free radical, cationic, anionic and living); condensation and copolymerization. Properties of polymers: Tg, tacticity, molecular weight-weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension.

UNIT II SURFACE CHEMISTRYAND CATALYSIS

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY
UNIT IV  CHEMICAL THERMODYNAMICS  9
Second law: Entropy-entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Free energy and work function: Helmholtz and Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius Clapeyron equation; Maxwell relations-Van’t Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation- variation of chemical potential with temperature and pressure.

UNIT V  NANOCHEMISTRY  9

OUTCOME
• Will be familiar with polymer chemistry, surface chemistry and catalysis.
• Will know the photochemistry, spectroscopy and chemical thermodynamics.
• Will know the fundamentals of nano chemistry.

TEXTBOOKS

REFERENCES

GE7152  ENGINEERING GRAPHICS  L  T  P  C
3  2  0  4

OBJECTIVES
• To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)  1
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.
UNIT I PLANE CURVES AND FREE HANDSKETCHING 14
Basic Geometrical constructions, Curves used in engineering practices-Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normals to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 14
Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 14
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to both the principal planes by rotating object method and auxiliary plane method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 14
Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) 3
Introduction to drafting packages and demonstration of their use.

L=45+T=30, TOTAL: 75 PERIODS

OUTCOMES:
On Completion of the course the student will be able to
- Perform free hand sketching of basic geometrical shapes and multiple views of objects.
- Draw orthographic projections of lines, planes and solids
- Obtain development of surfaces.
- Prepare isometric and perspective views of simple solids.

TEXT BOOK:

REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.

BS7161 BASIC SCIENCES LABORATORY
(Common to all branches of B.E. / B.Tech Programmes)

PHYSICS LABORATORY: (Any Seven Experiments)

OBJECTIVE:
- To inculcate experimental skills to test basic understanding of physics of materials including properties of matter, thermal and optical properties.
- To induce the students to familiarize with experimental determination of velocity of ultrasonic waves, band gap determination and viscosity of liquids.

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young’s modulus
3. Uniform bending – Determination of young’s modulus
4. Lee’s disc Determination of thermal conductivity of a bad conductor
5. Potentiometer-Determination of thermo e.m.f of a thermocouple
6. Laser- Determination of the wave length of the laser using grating
7. Air wedge - Determination of thickness of a thin sheet/wire
8. a) Optical fibre - Determination of Numerical Aperture and acceptance angle
   b) Compact disc- Determination of width of the groove using laser.
10. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
11. Post office box - Determination of Band gap of a semiconductor.
13. Viscosity of liquids - Determination of co-efficient of viscosity of a liquid by Poiseuille’s flow
OUTCOME:
- To determine various moduli of elasticity and also various thermal and optical properties of materials.
- To determine the velocity of ultrasonic waves, band gap determination and viscosity of liquids.

CHEMISTRY LABORATORY:
(Minimum of 8 experiments to be conducted)

1. Estimation of HCl using Na$_2$CO$_3$ as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler’s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-
Phenanthroline/thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 60 PERIODS

TEXTBOOKS
1. Vogel’s Textbook of Quantitative Chemical Analysis (8$^{th}$ edition, 2014)

GE7162 ENGINEERING PRACTICES LABORATORY
(Common to all Branches of B.E. / B.Tech. Programmes)

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OBJECTIVES
- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES 15
PLUMBING
Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
- Laying pipe connection to the suction side of a pump.
- Laying pipe connection to the delivery side of a pump.
- Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK
Sawing, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.
STUDY
- Study of joints in door panels and wooden furniture
- Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICES 15
- Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
- Stair case light wiring
- Tube – light wiring
- Preparation of wiring diagrams for a given situation.
- Study of Iron-Box, Fan Regulator and Emergency Lamp

GROUP – B (MECHANICAL AND ELECTRONICS) 15

3. MECHANICAL ENGINEERING PRACTICES
WELDING
- Arc welding of Butt Joints, Lap Joints, and Tee Joints
- Gas welding Practice.
- Basic Machining - Simple turning, drilling and tapping operations.
- Study and assembling of the following:
  a. Centrifugal pump
  b. Mixie
  c. Air Conditioner.

DEMONSTRATION ON FOUNDRY OPERATIONS.

4. ELECTRONIC ENGINEERING PRACTICES 15
- Soldering simple electronic circuits and checking continuity.
- Assembling electronic components on a small PCB and Testing.
- Study of Telephone, FM radio and Low Voltage Power supplies.

TOTAL: 60 PERIODS

OUTCOMES
- Ability to fabricate carpentry components and to lay pipe connections including plumbing works.
- Ability to use welding equipments to join the structures
- Ability to do wiring for electrical connections and to fabricate electronics circuits.

HS7251 TECHNICAL ENGLISH 4 0 0 4

OBJECTIVES
- To enable students acquire proficiency in technical communication.
- To enhance their reading and writing skills in a technical context.
- To teach various language learning strategies needed in a professional environment.

CONTENTS

UNIT I ANALYTICAL READING 12
Listening- Listening to informal and formal conversations; Speaking – Conversation Skills(opening, turn taking, closing )-explaining how something works-describing technical functions and applications;Reading –Analytical reading, Deductive and inductive reasoning; Writing- vision statement–structuring paragraphs.
UNIT II  SUMMARISING  12
Listening- Listening to lectures/talks on Science & Technology; Speaking — Summarizing/ Oral Reporting; Reading – Reading Scientific and Technical articles; Writing—Extended definition — Lab Reports — Summary writing.

UNIT III  DESCRIBING VISUAL MATERIAL  12
Listening- Listening to a panel discussion; Speaking — Speaking at formal situations; Reading — Reading journal articles - Speed reading; Writing — data commentary-describing visual material-writing problem-process - solution-the structure of problem-solution texts- writing critiques

UNIT IV  WRITING/ E-MAILING THE JOB APPLICATION  12
Listening- Listening to/ Viewing model interviews; Speaking — Speaking at different types of interviews – Role play practice (mock interview); Reading — Reading job advertisements and profile of the company concerned; Writing— job application — cover letter — Résumé preparation.

UNIT V  REPORT WRITING  12
Listening - Viewing a model group discussion; Speaking — Participating in a discussion - Presentation; Reading — Case study — analyse — evaluate — arrive at a solution; Writing— Recommendations - Types of reports (feasibility report) - designing and reporting surveys — Report format- writing discursive essays.

TEACHING METHODS:
Practice writing
Conduct model and mock interview and group discussion.
Use of audio — visual aids to facilitate understanding of various forms of technical communication.
Interactive sessions.

EVALUATION PATTERN:
Internals — 50%
End Semester — 50%

TOTAL:60 PERIODS

LEARNING OUTCOMES
- Students will learn the structure and organization of various forms of technical communication.
- Students will be able to listen and respond to technical content.
- Students will be able to use different forms of communication in their respective fields.

TEXTBOOK:

REFERENCES:
MATHEMATICS - II

(4 0 0 4)

MA7251

(Common to all branches of B.E. / B.Tech. Programmes in II Semester)

OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of the electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I MATRICES


UNIT II VECTOR CALCULUS

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $w = z + c, \frac{1}{z}, z^2$ - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION


UNIT V LAPLACE TRANSFORMS


TOTAL: 60 PERIODS

OUTCOMES:

- Upon successful completion of the course, students should be able to:
  - Evaluate real and complex integrals using the Cauchy integral formula and the residue theorem
  - Appreciate how complex methods can be used to prove some important theoretical results.
  - Evaluate line, surface and volume integrals in simple coordinate systems
  - Calculate grad, div and curl in Cartesian and other simple coordinate systems, and establish identities connecting these quantities.
• Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.

TEXTBOOKS:

REFERENCES:

EE7251 BASIC ELECTRICAL ENGINEERING AND MEASUREMENTS L T P C
3 0 0 3

OBJECTIVE:
To impart knowledge on
▪ Electric circuit laws and working principles of electrical machines
▪ Various types of measurement devices and transducers
▪ Fundamentals of signal conditioning and displays

UNIT I ELECTRICAL CIRCUITS
9

UNIT II ELECTRICAL MACHINES
9
Construction and Principle of operation DC machines- performance Characteristics , Construction and Principle of operation of single phase transformers, synchronous machines, three-phase and single-phase induction motors

UNIT III MEASUREMENT AND INSTRUMENTATION
9
Classification of instruments – moving coil and moving iron meters – Multimeters – dynamometer type wattmeter– energy meter – Megger – Instrument transformers (CT & PT)-Wheatstone’s bridge ,Maxwell’s bridge ,Schering Bridge

UNIT IV TRANSUCERS
9
Classification of transducers, strain, RTD, thermocouples, Piezo-electric transducer, LVDT,Turbine and electromagnetic flow meters, level transducers ultrasonic and fiber optic transducers, type of sensors, elastic sensors, viscosity, moisture and pH sensors, Digital transducers, vibrating wire instruments like load cells, stress meter, etc.
UNIT V  SIGNAL CONDITIONING AND DISPLAY  9
Instrumentation amplifiers- Filters- A/D and D/A converters - Multiplexing and data acquisition - LED, LCD and CRT displays.

OUTCOMES:
At the end of the course the students will be able to
  - Understand electric circuits and working principles of electrical machines
  - Choose appropriate instruments for electrical measurement for a specific application
  - Understand the concepts of various transducers and signal conditioning.

TEXT BOOKS

REFERENCES

GE7151  COMPUTING TECHNIQUES  L T P C
 (Common to all branches of Engineering and Technology) 3 0 0 3

OBJECTIVE
• To learn programming using a structured programming language.
• To provide C programming exposure.
• To introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

UNIT I  INTRODUCTION  9
Introduction to Computers – Computer Software – Computer Networks and Internet - Need for logical thinking – Problem formulation and development of simple programs - Pseudo code - Flow Chart and Algorithms.

UNIT II  C PROGRAMMING BASICS  9

UNIT III  ARRAYS AND STRINGS  9

UNIT IV  POINTERS  9
Macros - Storage classes –Basic concepts of Pointers– Pointer arithmetic - Example Problems - Basic file operations
UNIT V  FUNCTIONS AND USER DEFINED DATA TYPES  9

TOTAL :  45  PERIODS

OUTCOME
At the end of the course, the student should be able to:
• Write C program for simple applications
• Formulate algorithm for simple problems
• Analyze different data types and arrays
• Perform simple search and sort.
• Use programming language to solve problems.

TEXTBOOKS:

REFERENCES:

GE7153  ENGINEERING MECHANICS  L T P C
4 0 0 4

OBJECTIVE :
• The objective of this course is to inculcate in the student the ability to analyze any problem in a simple and logical manner and to predict the physical phenomena and thus lay the foundation for engineering applications.

UNIT I  STATICS OF PARTICLES  12

UNIT II  EQUILIBRIUM OF RIGID BODIES  12
UNIT III DISTRIBUTED FORCES
Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration, Theorems of Pappus-Guldinus, Distributed Loads on Beams, Center of Gravity of a Three-Dimensional Body, Centroid of a Volume, Composite Bodies, Determination of Centroids of Volumes by Integration. Moments of Inertia of Areas and Mass - Determination of the Moment of Inertia of an Area by Integration, Polar Moment of Inertia, Radius of Gyration of an Area, Parallel-Axis Theorem, Moments of Inertia of Composite Areas, Moments of Inertia of a Mass - Moments of Inertia of Thin Plates, Determination of the Moment of Inertia of a Three-Dimensional Body by Integration.

UNIT IV FRICTION

UNIT V DYNAMICS OF PARTICLES

OUTCOMES:
• Upon completion of this course, students will be able to construct meaningful mathematical models of physical problems and solve them.

TEXT BOOK

REFERENCES
UNIT I SEMICONDUCTORS AND RECTIFIERS
Classification of solids based on energy band theory, Intrinsic semiconductors, Extrinsic semiconductors – P-type and N-type, P-N junction, VI Characteristics of PN junction diode, Half and Full wave rectifiers, Zener effect, Zener diode, Zener diode Characteristics, Zener diode as a regulator.

UNIT II TRANSISTOR AND AMPLIFIERS
Bipolar junction transistors – CB, CE, CC configurations and characteristics, Biasing circuits – Fixed bias, Voltage divider bias, CE amplifier, Concept of feedback, Negative feedback, voltage series feedback amplifier, Current series feedback amplifier.

UNIT III FET AND POWER ELECTRONIC DEVICES
FET – Configuration and characteristics, FET amplifier, Characteristics and simple applications of SCR, Diac, Triac and UJT.

UNIT IV SIGNAL GENERATORS AND LINEAR ICS

UNIT V DIGITAL ELECTRONICS
Boolean algebra, Logic Gates, , Half and Full adders, Decoder, Encoder, Multiplexer, Demultiplexer, Flip flops, Digital to Analog converters - R-2R and weighted resistor types, Analog to Digital converters - Successive approximation and Flash types.

OUTCOMES:
- Ability to identify electronics components and use them to design circuits.

TEXT BOOK:

REFERENCES:

OBJECTIVE:
- To train the students in performing various tests on electrical drives, sensors and circuits.

LIST OF EXPERIMENTS:
1. Load test on separately excited DC shunt generator
2. Load test on DC shunt moor
3. Load test on S Transformer
4. Load test on Induction motor
5. Regulation of 3 Alternator
6. Study of CRO
7. Logic gates
8. Operational amplifiers
9. Time constant of RC circuit
10. Characteristics of LVDT
11. Calibration of Rotometer
12. RTD and Thermistor
13. Flapper Nozzle system

TOTAL: 60 PERIODS

OUTCOMES:
- Ability to perform speed characteristic of different electrical machine
- Ability to use of diodes, transistors for rectifiers
- Ability to use of operational amplifiers

GE7161 COMPUTER PRACTICES LABORATORY

OBJECTIVES
- To understand the basic programming constructs and articulate how they are used to
develop a program with a desired runtime execution flow.
- To articulate where computer programs fit in the provision of computer-based solutions
to real world problems.
- To learn to use user defined data structures.

LIST OF EXPERIMENTS
1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function
10. Program using structures and unions.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student should be able to:
- Write and compile programs using C programs.
- Write program with the concept of Structured Programming
- Identify suitable data structure for solving a problem
- Demonstrate the use of conditional statement.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
30 Systems with C compiler
CE7251  STRENGTH OF MATERIALS  L  T  P  C  3 0 0 3

OBJECTIVE:
- To understand the stresses developed in bars, compounds bars, beams, shafts, cylinders and spheres.

UNIT I  STRESS, STRAIN AND DEFORMATION OF SOLIDS  9

UNIT II  TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM  9

UNIT III  TORSION  9
Torsion formulation stresses and deformation in circular and hollows shafts – Stepped shafts – Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs, carriage springs.

UNIT IV  DEFLECTION OF BEAMS  9
Double Integration method – Macaulay’s method – Area moment Theorems for computation of slopes and deflections in beams - Conjugate beam and strain energy – Maxwell’s reciprocal theorems.

UNIT V  THIN CYLINDERS, SPHERES AND THICK CYLINDERS  9
Stresses in thin cylindrical shell due to internal pressure circumferential and longitudinal stresses and deformation in thin cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells – Lame’s theory – Application of theories of failure.

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply mathematical knowledge to calculate the deformation behavior of simple structures.
- Critically analyse problem and solve the problems related to mechanical elements and analyse the deformation behavior for different types of loads.

TEXT BOOKS:

REFERENCES:
OBJECTIVE

- The students should be conversant with
- Treatment of water for domestic and industrial purpose
- Applications of different kinds of polymers, lubricants and adhesives.
- Different kinds of alloys and powder metallurgy involving condensed systems.
- Principles and instrumentation of spectroscopic and microscopic analysis.

UNIT I  WATER TECHNOLOGY AND CORROSION

Water-sources, properties, characteristics imparted by impurities in water, significance of water quality parameters in terms of pH, conductivity, hardness, alkalinity, COD, BOD, iron, chloride and sulphate, Water treatment-reverse osmosis, ion exchange demineralization and zeolite processes; Corrosion-types, corrosion control; paints-constituents and their functions- mechanism of drying of an oil paint.

UNIT II  LUBRICANTS AND ADHESIVES

Lubricants and lubrication- functions-classification with examples-properties (viscosity index, flash and fire point, oiliness, carbon residue, aniline point, cloud and pour point)-greases (calcium based, sodium based, lithium based only)-solid lubricants-graphite and molybdenum sulphide. Adhesives- adhesive action-development of adhesive strength-physical and chemical factors influencing adhesive action-bonding process of adhesives-phenol formaldehyde resins, polyurethane, epoxy resins and urea formaldehyde.

UNIT III  POLYMERS, COMPOSITES AND FOAMS


UNIT IV  ALLOYS AND PHYSICAL METALLURGY


UNIT V  INSTRUMENTAL METHODS AND ANALYSIS


OUTCOME

- Will be familiar with corrosion and its control.
- Will know the characterization techniques.
- Will know the water quality analysis for industrial applications.
TEXTBOOKS

REFERENCES

MA7358 TRANSFORM TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATIONS L T P C
4 0 0 4

OBJECTIVES:
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes;
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems;
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic;
- To develop Z-transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems.

UNIT I  PARTIAL DIFFERENTIAL EQUATIONS 12

UNIT II  FOURIER SERIES 12
Dirichlet’s conditions – General Fourier series – Odd and even functions – Half-range Sine and cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic Analysis.

UNIT III  APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATION 12
Method of separation of variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in cartesian coordinates.

UNIT IV  FOURIER TRANSFORM 12

UNIT V  Z – TRANSFORM AND DIFFERENCE EQUATIONS 12

TOTAL : 60 PERIODS
OUTCOMES:
- The students can able to solve the partial differential equations, find the Fourier series analysis and solve the problems by using Fourier transform and Z transform techniques.

TEXTBOOKS:

REFERENCES:

ME 7354 MECHATRONICS

OBJECTIVE:
- To impart knowledge about the elements and techniques involved in Mechatronics systems in understanding the concept of automation.

UNIT I INTRODUCTION

UNIT II 8085 MICROPROCESSOR

UNIT III PROGRAMMABLE PERIPHERAL INTERFACE

UNIT IV PROGRAMMABLE LOGIC CONTROLLER
Introduction – Architecture – Input / Output Processing – Programming with Timers, Counters and Internal relays – Data Handling – Selection of PLC.

UNIT V ACTUATORS AND MECHATRONICS SYSTEM DESIGN

TOTAL: 45 PERIODS
OUTCOME:
Upon completion of this course, the students will be able to:

- Design Mechatronics systems with the help of Microprocessor, PLC and other Electrical and Electronics Circuits.

TEXT BOOKS:

REFERENCES:

PT7301 PREPRESS AND IMAGING TECHNOLOGY

OBJECTIVES:

- To understand the fundamental principles of conventional and digital imaging and screening technologies
- To comprehend the stages in conventional and digital prepress workflow
- To learn the working principle of imaging and output devices in prepress

UNIT I THEORY OF IMAGING

UNIT II CONVENTIONAL PREPRESS WORKFLOW
Printer’s measurement system; Typographic Parameters; Text Input methods; Copy mark-up; Casting off; Copy editing; Proof reading; Originals for reproduction; Repro Cameras, Photographic Film - Types; Line reproduction; Halftone reproduction; Film Imposition; Proofing; Plate exposing and Developing.

UNIT III DIGITAL IMAGING AND SCREENING
Digital Image acquisition; Image sensors - PMT, CCD, CMOS; Scanner - Working Principle, Types; Digital Camera - Working Principle, types; Image acquisition factors - Dynamic range, Resolution, Storage, Compression Techniques, File formats; Digital Image Processing; Image processing software - features; Digital Halftoning - Thresholding, Dithering, Clustered dots, Dispersed dots, Error diffusion; Digital Screening technologies - Dot shapes, Dot angles, Screen rulings, AM, FM, Rational Tangent, Supercell, Irrational; Fonts – Outline, TrueType, OpenType, PostScript;
UNIT IV      PREPRESS OUTPUT DEVICES
Laser sources - Types of lasers used in imaging, Choice and Selection of laser; Modulation - Direct laser modulation, Acousto-optic modulation, Electro-Optic Modulation; Deflection methods – Mechanical deflectors. Holographic deflectors, Solid state deflectors, Polygon Scanning, Facet tracing optics and Scan-end detection mechanism; Lens and lens aberrations; Imagesetters - Principle, Types; Platesetters - Principle, Types.

UNIT V      DIGITAL PREPRESS WORKFLOW
Workflow system - Components; Data Receiving and verification, Page Layout Design, PDF creation, Trapping, Pre-flighting, Proofing, Imposition, Raster image processors, Archiving, Versioning, Digital Asset Management; Management Information Systems - CIP4, JDF;

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
• Explain how continuous tone originals are converted into halftones in conventional and digital methods.
• Identify the job sequence in prepress and the software and hardware requirements
• Analyze the features of workflow systems, imaging devices and output devices

TEXT BOOKS:

REFERENCES:
3. Phil Green, Understanding digital colour, Blueprint, 1995
UNIT III   DESIGNING FOR MEDIA

UNIT IV   INTRODUCTION TO PRINTING PROCESSES
Types of process – Letterpress, Offset, Gravure, Flexography, Screen printing, Digital Printing Processes; Overview on image carrier preparation and finishing operations for different types of printing process

UNIT V   DESIGN MANAGEMENT & PRODUCTION PLANNING
Relationship between designer, customer and printer; selection and co-ordination of production process; Limitation of printing process, binding, finishing and ancillary processes on design; selection and specification of ink, paper and other materials; production strategy

OUTCOMES:
Upon completion of the course, the student will be able to:
- Create layouts and designs for various print products.
- Learn the key identifying characteristics of each printing process.
- Comprehend the relationship between designer, customer and printer

TEXT BOOKS:

REFERENCES:

CE7261   STRENGTH OF MATERIALS LABORATORY

OBJECTIVES:
- To study the mechanical properties of materials subjected to different types of loading.

LIST OF EXPERIMENTS
1. Tension test on mild steel rod
2. Compression test on wood
3. Double shear test on metal
4. Torsion test on mild steel rod
5. Impact test on metal specimen (Izod and Charpy)
6. Hardness test on metals (Rockwell and Brinell Hardness Tests)
7. Deflection test on metal beam
8. Compression test on helical spring
9. Deflection test on carriage spring

OUTCOMES:
- The students will have the knowledge in the area of testing of materials

TOTAL: 45 PERIODS

TOTAL: 60 PERIODS
REFERENCES:
2. IS 432(Part I ) -1992 – Specification for mild steel and medium tensile steel bars and hard
drawn steel wire for concrete reinforcement

PT7311  CREATIVE GRAPHIC DESIGN LABORATORY  L T P C
0 0 4 2

OBJECTIVE:
- To understand the concepts of design and promote lateral thinking

EXERCISES:
1. Thumbnails and Rough sketches of logos
2. Thumbnails and Rough sketches of advertisements
3. Thumbnails and Rough sketches of lettering
4. Prepare layouts for magazine
5. Prepare layouts for newspaper
6. Prepare layouts for books
7. Prepare layouts for web publishing
8. To develop artworks and design print products using collage and paint
9. To develop a drawing folio and keep a sketch book as a record of ideas
10. To develop designs using digital art techniques

OUTCOMES:
Upon completion of the course, the student will be able to:
- Create layout designs for books, newspaper and magazines
- Understand the concepts of logos and symbols
- Develop creative artworks

TOTAL: 60 PERIODS

MA7352  APPLIED STATISTICS  L T P C
4 0 0 4

OBJECTIVE:
- The students will have a fundamental knowledge of the concepts of statistical inference
  and apply the tools in management problems.

UNIT I  TESTS OF SIGNIFICANCE  12
Sampling distributions – Central limit theorem-Tests for single mean, proportion and difference of
means, proportions (large and small samples) - Tests for single variance and equality of
variances- \( \chi^2 \) - test for goodness of fit - Independence of attributes.

UNIT II  NON - PARAMETRIC TESTS  12
Advantages and drawbacks over parametric methods – Sign test - Median test – Mann-Whitney

UNIT III  DESIGN OF EXPERIMENTS  12
Completely randomized design - Randomized block design - Latin square design - \( 2^2 \) factorial
design - Taguchi’s robust parameter design.
UNIT IV  STATISTICAL QUALITY CONTROL  12
Control charts for variables - Control charts for attributes - Tolerance limits - Acceptance sampling by attributes.

UNIT V  TIME SERIES  12

OUTCOMES:
- The students can independently participate in the processes of analysis, planning, formulating strategies of development, decision-making, governing and management, and independent making of tactical and strategic decisions related to the statistics.

TEXTBOOKS:

REFERENCES:

ME7353  MECHANICS OF MACHINES  L T P C 3 0 0 3

OBJECTIVES:
- To understand the principles in the formation of mechanisms and their kinematics.
- To understand the effect of friction in different machine elements.
- To analyze the forces and torque acting on simple mechanical systems.
- To understand the importance of balancing and vibration.

UNIT I  KINEMATICS OF MECHANISMS  9

UNIT II  GEARS AND GEAR TRAINS  9

UNIT III  FRICTION IN MACHINE ELEMENTS  9
Surface contacts – Sliding and Rolling friction – Friction drives – Friction in screw threads – Bearings and lubrication – Friction clutches – Belt and rope drives – Friction aspects in brakes– Friction in vehicle propulsion and braking.
UNIT IV FORCE ANALYSIS

UNIT V BALANCING AND VIBRATION

OUTCOME:
- The course will enable the student to understand the forces and torque acting on simple mechanical systems and also the importance of balancing and vibration and the effect of friction in different machine parts of practical significance.

TEXT BOOK:

REFERENCES:
UNIT II  PRINCIPLES OF COLOUR REPRODUCTION  

UNIT III  COLOUR CORRECTION & IMAGE ADJUSTMENTS  
Masking and its principles, Balanced inks, Tone reproduction, Gray balance, Color separation strategies - Graphical, mathematical, empirical; Black generation- Skeletal, UCR, GCR; Colour correction - White point & Black point setting, Colour cast removal, USM, UCA;

UNIT IV  SPECTRAL SENSITIVITIES, INK & PAPER  

UNIT V  COLOUR CONTROL  
Press standardization - Dot gain, Density, Trapping, Gray balance, Total Area Coverage; Colour Management – Need, Open loop, Closed loop, ICC, Profiles, Rendering intent, Calibration, Characterization, Conversion; Digital proofing – Need & issues, Soft proofing, Remote proofing; Colour Servers.

OUTCOMES:  
Upon completion of the course, the student will be able to:  
- Evaluate colour originals and choose appropriate reproduction technique.  
- Apply suitable compensation in prepress while color separation.  
- Evaluate colour and other print attributes.  
- Ensure color match between original and printed reproduction

TEXT BOOKS:  

REFERENCES:  
1. Abhay Sharma, Understanding Colour Management, Thomson Delmar, 2004  
OBJECTIVES:
- To learn the basic principles of flexographic printing
- To understand plate preparation and mounting methods
- To understand the flexographic press types and components

UNIT I  INTRODUCTION
Flexography – Basic principle, advantages, limitations, applications; Designing for flexo - Type, Tint, Vignette, Reverse, Registration tolerances, Barcode design; Template/Dieline preparation; Preflighting; Proofing; Design considerations, Screening Technologies for flexo; Press types – stack, CI, inline, narrow web, wide web; Variations of press – coating, lamination, corrugated postprinting; environment and safety aspects; Ink, substrates.

UNIT II  IMAGE CARRIER PREPARATION
Construction, Characteristics, Preparation - Moulded rubber plates, Sheet photopolymer plates, Liquid photopolymer plates; Direct Imaged Plates - Image Masking Technologies, Equipments; Plate considerations – plate handling, storage, wrap distortion, Ink and solvent compatibility, quality.

UNIT III  MOUNTING AND PROOFING
Plate mounting procedures - Optical, Pin Register, Microdot, Video, Sleeve; Mounting tapes - types, properties, selection; Improving press performance through mounting; Proofing procedure.

UNIT IV  PRINTING PRESS
Printing station – fountain rollers, anilox rollers, doctor blades, plate cylinders, impression rollers; Automatic viscosity controls; Web Handling - Infeed, Outfeed, web guiding, pneumatic shafts and chucks; Web treatment and processing - Film treating, Dryers, Cooling rollers, static electricity, substrate cleaning, varnishing; Press Mechanics; Drives - Gear, Servo; Web inspection systems; Pressroom Practices

UNIT V  QUALITY CONTROL
Plate Standardization, Flexo QC targets, Flexographic Print Evaluation, Job specific print variables, Color Matching, Press Optimization, Fingerprinting, Troubleshooting, Case studies.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- State the factors influencing designing for flexography.
- Discuss about the working of flexographic press and its control.
- Identify and solve print problems
- Implement quality control in flexographic printing workflow

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
To impart knowledge on
- The principles of Gravure printing process, components of gravure printing machines and cylinder preparation techniques.
- The principles of Screen printing process, stencil preparation methods and types of presses.
- Print problems and quality control in Gravure and screen printing process

UNIT I          GRAVURE PROCESS AND IMAGE CARRIER PREPARATION 10
Process characteristics, cylinder construction – design, balancing, copper plating and polishing; reuse of cylinder; well formation; film positives; cylinder layout and film assembly; cross line screen, image carrier preparation techniques – diffusion etch process, direct transfer process, electromechanical, laser and electron beam engraving process.

UNIT II         GRAVURE PRINTING MACHINE 10
Doctor blade assembly – conventional, reverse angle, holder, loading, doctor and back-up blades; oscillation, positioning; impression rollers – types; loading, deflection; electrostatic assist impression system; inking system – types; dryer – types; Press design – types; in feed and out feed coating; lamination, inline solventless lamination; inline converting operations; power transmission system.

UNIT III            SCREEN PRINTING COMPONENTS 8
Process characteristics; essential components; Screen fabrics – types, fabric terminology, fabric selection; frames – types; fabric tension characteristics; tension measurement; squeegees – types, techniques, selection, maintenance and blade sharpening; substrates and inks; screen printed product

UNIT IV             STENCIL PREPARATION AND PRESSES 9
Stencil types – Direct stencil, indirect stencil, capillary film – stencil exposure, stencil preparation; stencil selection; presses – graphic presses, textile presses, and container printing; dryers – types.

UNIT V           PRINT PROBLEMS AND QUALITY CONTROL 8
Print problems and remedies; quality control aids; maintenance; health and safety issues; waste disposal and environmental safeguards.

OUTCOMES:
Upon completion of the course, the student will be able to:
- Acquire the basic principles of gravure and screen printing
- Compare and analyze the types of gravure and screen printing machines
- Identify and rectify print problems in gravure and screen printing processes

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand about paper manufacturing processes
- To learn the properties of paper and paperboard and testing methods
- To be familiar with paper related problems in printing.

UNIT I  RAW MATERIALS & PROCESSING  9

UNIT II  MANUFACTURING  9
Paper making machines, Head boxes and inlets, Forming Section, Press and dryer section, wires, felts, automation; Calendaring – types. Board manufacturing – cylinder machines.

UNIT III  COATING & CLASSIFICATION  9
Paper and board coating – Pigments, binders and additives– Techniques; Main classes of paper and board; paper and board sizes; paper requirements for different printing processes; paper handling, De-Inking - methods, recycling, paper properties, end-use; Environmental aspects and certification.

UNIT IV  PROPERTIES  9
Structural – Formation, 2-sidedness, grain direction; Physical – GSM, caliper, bulk, porosity, smoothness, dimensional stability, curl, moisture content and relative humidity, Cobb tester, Optical -Gloss, brightness, Whiteness, colour, opacity; Chemical – pH, ash content; Mechanical – Tensile, burst, tear, internal bonding, fold endurance, stiffness, pick resistance, absorbency; Paperboard - types, properties, applications;

UNIT V  PAPER AND PAPERBOARD RELATED PROBLEMS IN PRINTING  9
Fluff, hickies, picking, piling, slurring and doubling, curl, chalking, set-off, mottle, poor ink drying, show through, strike through mis-register, static electricity, blistering, and web break.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Comprehend paper science and manufacturing process.
- Test the paper and paperboard for its compliance with standards and specifications
- Identify and solve paper related problems in printing.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To learn typography and page layout designing
- To understand file preparation techniques and preflighting.

EXERCISES:
1. Create page layouts applying Typographic styles, Columns and tables.
2. Create layouts integrating text, graphics and images.
3. Create layouts for newspapers.
4. Create various layout styles for brochures.
5. Create bookwork with Tag/style formatting, TOC, Footnote, Index.
6. Create bookwork with References, Bibliography.
8. Create Custom Preflighting Profiles and check output files.
10. Template Creation.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Effectively use Pagination software
- Apply appropriate typographic styles based on job requirement
- Create page layouts for various jobs.

OBJECTIVES:
- To learn the basics of graphic design and image editing software.
- To understand the concept and application of layers in design.
- To learn to retouch and edit images.

Graphic Design Software
1. Introduction to Vector Graphic Design Software Features and tools
2. Creation of shapes & objects using drawing tools
3. Logo Creation using Object Transformation tools
4. Graphic Design using layers
5. Wrapper Design

Image Editing and Colour Correction Software
1. Introduction to Raster Graphics Software Features and tools
2. Image acquisition from scanner and digital camera
3. File formats & Sampling
4. Tonal adjustment, Histogram analysis and equalization
5. Image editing using masking and special effects

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Design graphics for different media and applications.
- Edit and retouch graphics creatively.
OBJECTIVES:
To impart knowledge on
- The basic concepts of costing, pricing, estimating and investment analysis
- Cost estimating for various print jobs

UNIT I  COSTING AND PRICING  8
Costing systems - cost; profit; price; functions of costing; costing models; types of costing –
marginal costing, job costing, budgeting costing; types of budgets; budgetary control; sales
forecasts and budgets for printing and allied industries; relationship between cost control and
budgetary control.

UNIT II  ESTIMATING  8
Cost estimating, price estimating, estimator needs; procedure for selling, estimating, pricing and
quoting for printing; estimating methods; production planning; computerized estimating.

UNIT III  ESTIMATING PRINTING MATERIALS FOR PROCESSES  10
Paper- sheet and web; ink; toners; pre-press; machine printing – sheet-fed offset, web offset,
flexography, gravure, screen printing, digital printing; post press; e-publishing.

UNIT IV  COST ANALYSIS  10
Classification of cost; elements of cost; costing of direct materials; costing of manual operations;
costing of machine operations; costing – typesetting, scanning, plate-making, printing, binding and
finishing operations.

UNIT V  INVESTMENT ANALYSIS  9
Time value of money, compound value, present value, annuities, pay back method, average rate of
return and internal rate of return method; Depreciation, Return on Investment, Return On Capital
Expenditure; Break even analysis – Calculation of break even point, margin of safety, sensitivity
analysis and profit graphs, Basics of Credit Management – AR, AP.

OUTCOMES:
Upon completion of the course, the student will be able to:
- Estimate the cost of different materials used in printing
- Calculate the composite machine hour rate (CMHR) and budgeted hour rate (BHR) for the
  machines used in printing
- Do Investment analysis and break even analysis

TEXT BOOKS:

REFERENCES:
1. Cost Accounting for Printers, Part I and Part II, British Printing Industries Federation, 1982
2. K.S. Venkataraman and K.S. Balaraman, Estimating Methods and Cost Analysis for
   Printers, Ramya Features and Publications, 1987
OBJECTIVE:
• To impart knowledge about offset printing and mechanisms of sheetfed offset printing machines

UNIT I  PRINCIPLES OF OFFSET PRINTING, PLATE CHEMISTRY & PROCESSING  9
Principles of lithography, wetting of a solid surface by a liquid before and after surface treatment. Base materials & properties – Aluminium, Stainless steel, Copper, Chromium, Nickel, Poly masters and paper masters; Graining – types; Contact angle and wettability; Anodisation – Process; Plate chemistry – Conventional plates, Photopolymer compounds, Digital Imaging Plates-Thermal sensitive, Silver halide, Silver hybrid plates; Plate exposing unit; Light source – Types advantages, disadvantages, Plates for digital imaging-, sensitivity, chemistry, mechanism of image formation and processing. Processless plates. Desensitizing process, gum, developing inks, lacquers and asphaltum, Quality Control Aids.

UNIT II  SHEET FEEDING AND CONTROL  9
Fundamental elements of offset printing machine. Sheet feeding requirements. Types of feeders, sheet controls, drives, suction head mechanism, double sheet and no sheet detectors, side lays and front lays. Non-stop feeders. Sheet insertion and transfer systems, working principle, relative merits.

UNIT III  PRINTING UNIT CONFIGURATION  9

UNIT IV  PRINTING BLANKETS, ROLLERS AND FOUNTAIN SOLUTION  9
Blanket types, requirements, manufacture, performance attributes. Rollers, types, properties, behavior. Emulsification of ink and fountain solution, fluid behavior in a nip. Basic inking and dampening system configuration. UV coaters and dryers; Fountain solution requirements, composition, re-circulation system and dosing units, Ink/water balance.

UNIT V  PRINTING AND INLINE OPERATIONS  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
• Describe the concepts of sheetfed offset printing
• Explain the sheetfed offset machine design and its mechanisms
• Identify factors influencing print quality
• Troubleshoot print problems

TEXT BOOKS:
1. Lloyd P. Dejidas, Thomas M. Destree, Sheetfed Offset Press Operating, GATF, 2005
REFERENCES:

PT7503 PACKAGING MATERIALS

OBJECTIVES:
• To introduce the fundamental knowledge in the different types of packaging materials
• To impart knowledge in the selection of suitable material for various packaging applications.

UNIT I PLASTICS
Polymers, Plastics in packaging – types, advantages; Flexible and Rigid packaging – Properties, applications; Thermoplastic Materials, Thermoset Materials, Food grade plastics – properties, processing methods, applications; Recycling; Biodegradable and Eco friendly packaging - Advantages and disadvantages.

UNIT II WOOD, PAPER AND TEXTILE
Wood – Types, Materials, characteristic properties, application, Nature of wood, properties, wood treatment; Textile – Types of cloth, properties, application; Paper and Board – Types, Manufacturing, Properties, Specialty papers for Packaging, Folding board cartons and coated cartons, Corrugated Boards – Types, Applications, Specifications.

UNIT III GLASS AND METALS
Glass – Types, Properties, use, Chemistry, coatings, defects and application areas; Metals – Tin, Steel, Aluminium – Cans, drums, lacquers, sheet – Materials, properties, treatment, coatings, recycling process; Foil – Materials, characteristics, decoration, lamination and metallization methods.

UNIT IV ANCILLARY MATERIALS

UNIT V MATERIAL TESTING
Mechanical – Tensile, Tear burst, impact; barrier properties - WVTR test, OTR test, Adhesion test, Optical – Gloss, haze and clarity; Chemical Resistance test – solvents and chemicals, Migration test, Plastic material identification test, solvent retention; Hardness and corrosion test for metals; Clarity and brittleness test for glass.

OUTCOMES:
Upon completion of the course, the student will be able to:
• Select suitable packaging material for various applications.
• Select suitable ancillary materials for different applications.
• Ensure quality control standards used for testing of packaging materials.
TEXT BOOKS:
2. S. Natarajan, M. Govindarajan, and B. Kumar Fundamental of Packaging Technology PHI, New Delhi, 2014

REFERENCES:

PT7504 PRINTING INKS AND COATINGS

OBJECTIVES:
- To study the raw materials, properties, manufacturing processes of printing inks
- To be familiar with print problems related to inks used for different printing processes

UNIT I RAW MATERIALS
Colorants – Classification, preparation and properties; Inorganic – white and coloured, carbon black, metallic, ultramarine and fluorescent; organic - Diarylide yellow, Hansa yellow, Rhodamine, Lithol, Rubine; Dyestuffs and oils- Types, Preparation, Properties and uses; Varnishes-types, applications; Solvents - General properties; Solvents like Hydrocarbon, alcohols, glycols, ketones, esters and their properties; Resins – Natural Rosin and its derivatives and Gumarabic; Synthetic – Rosin modified fumaric, maleic and phenolic, alkyls, hydro carbons, polyamides, Polyvinyl, Epoxy resins, Acrylic resins, EthylCellulose and Nitrocellulose; Additives– Properties and applications Driers, Waxes, Antioxidants, plasticizers, wetting agents, defoaming agents and Antiskinning agents.

UNIT II PRINTING INKS FOR DIFFERENT PROCESSES
Offset Inks – Pigments, Resins, Vehicles, Plasticizers, Additives, Ink dispersion, Ink rheology and variables; Inks for sheet and web – Book printing, package printing, publication printing; Flexography Inks – colorants, pigments and dyes, selection criteria, Ink vehicle and its properties, resin types and selection criteria, Additives, Ink rheology, Inks for paper, plastics and foil; Gravure Inks – colorants, Vehicles, solvents, Ink additives, Publication gravure inks, Packaging and product inks, rheology; Screen inks - Constituents, Properties, Inks for paperboard, plastic containers, textile inks, impervious substrates and metallic substrates; Manufacturing methods – Paste inks, Liquid inks, premixing, Flowchart - Ball mill, Bead mill and Triple roll mill.

UNIT III INK TEST AND MEASUREMENTS
UNIT IV  SPECIALITY INKS AND INK DRYING MECHANISMS
Water based inks; Inkjet printing inks; Radiation curable inks-IR, UV & EB–Raw materials, equipment used for drying; Security inks–Thermochromic and Photochromic; Nanoinks; Ink drying mechanisms.

UNIT V  COATINGS
Coating types - Oil based, water based, UV and EB coatings and nano emulsions, Roller coatings and Hybrid coatings - constituents, properties.

OUTCOMES:
Upon completion of the course, the student will be able to:
• Comprehend the manufacturing process of Inks.
• Follow the standards used for testing of printing Inks.
• Rectify the problems related to printing inks on different printing process.
• Select inks for different applications

TEXT BOOKS:

REFERENCES:
UNIT II    SOFT SKILLS

UNIT III    PRESENTATION SKILLS
Preparing slides using the computer – structuring the content (parts of a presentation)– body language – answering questions – individual presentation practice — mini presentation (practice sessions)

UNIT IV   GROUP DISCUSSION SKILLS
Participating in group discussions – understanding group dynamics – brainstorming – questioning and clarifying – GD strategies (expressing opinions, accepting or refusing others opinions, turn taking) – activities to improve GD skills – viewing recorded GD – mock GD.

UNIT V    INTERVIEW SKILLS
Interview etiquette–technical Interview/HR Interview/body language – mock interview – attending job interviews – Types of interviews- telephone/skype interview – stress interview, one to one/panel interview – FAQs related to job interview.

TOTAL: 45 PERIODS

OUTCOMES
• Students will be able to make presentations and participate in group discussions with confidence.
• Students will be able to perform well in interviews.
• They will have adequate writing skills.

REFERENCES:

EXTENSIVE READERS

WEB RESOURCES
1. www.humanresources.about.com
2. www.careerride.com

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OBJECTIVE:
To make imposition schemes, and prepare offset plates incorporating quality control aids.

EXERCISES:
1. Types of planning and layout preparation – Regular, Irregular images
2. Sheet work and Half sheet film assembly for 32,64 and 128 pages book work
3. Materials Requirement Planning
4. Introduction to various workflow software modules
5. PDF – Preparation, normalization and preflighting
6. PDF – Analyzing files for print production
7. Creating a digital imposition – Book Work, Multiple-Ups
8. Obtaining RIP output – Proofing, Plate
9. Exposure optimization and standardization
10. Preparing offset plates with quality aids

TOTAL : 30 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Design and plan any print jobs for the commercial press.
- Estimate the plate and paper requirements for the jobs
- Adapt to any automatic workflow software in the industries.
- Understand the variables in plate making and standardize plate preparation

OBJECTIVES:
- To understand the controls, settings and mechanisms of printing machines.
- To have hands on training in Semiautomatic and Automatic printing machine.

EXERCISES:
1. Study of controls, operations and specifications of printing machines.
2. Feeder setting and Plate fixing
4. Study of various mechanisms and settings.
5. Comparative study on different offset printing machines.
7. Roller and Cylinder pressure setting.
8. Study the effect of packing on print length.
10. Densitometric measurements.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Operate a sheetfed offset press
- Identify process control parameters
- Standardize the machine and evaluate print quality
OBJECTIVES:
To the study of nature and the facts about environment.
- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Field study of common plants, insects, birds.
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards– soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10
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 – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.
Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7
From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental...

UNIT V HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45 PERIODS

OUTCOMES:
Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environment at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in standard of living has lead to serious environmental disasters.

TEXT BOOKS:

REFERENCES:

PT7601 PACKAGING TECHNOLOGY

OBJECTIVES:
- To understand the purpose of packaging design
- To study the different types of packaging process
- To understand the packaging testing methods

UNIT I INTRODUCTION

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

UNIT II PACKAGE DESIGN

Package design, Package specification Types of design, structural, graphics, Factors influencing design, fundamentals of graphic layout design, Package colour- Selection criteria - Applications, Types of load, unit load - safe stacking load, elements and principles of design, Structural design – cans, bottles, folding cartons, corrugated boxes, CAD applications
UNIT III PACKAGING TYPES

UNIT IV MANUFACTURING PROCESSES
Folding carton manufacturing – cutting; creasing; die making-punching – Cartoning Machineries – types, flexible pouches forming machines, corrugated box manufacturing process, Rigid boxes manufacturing process, Drums – types, applications; Molded pulp containers; Three piece and two piece can; seam treatment types, Collapsible tubes, Flexible pouches forming machines; Metal foil packaging; bag making machinery-types; packaging line automation

UNIT V PACKAGE TESTING
Package Performance testing- test standards; drop test, inclined impact, horizontal impact, vibration testing, stacking and compression test, corrugated board testing.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Articulate the types of packages and manufacturing processes.
- Comprehend the importance of package design for various applications
- Analyse various test methods for package suitability

TEXT BOOKS:

REFERENCES:
UNIT II  SEQUENCING  
Gantt chart, Algorithms for solving sequencing problems – Processing of N jobs through 2 machines, n jobs through 3 machines, n jobs on K machines, Assignments and transportation algorithms, Production Line Balancing

UNIT III  INVENTORY MANAGEMENT  
Definition & purpose, Inventory classification, EOQ, Materials handling & Warehousing.

UNIT IV  MATERIALS & CAPACITY REQUIREMENT PLANNING  
MRP, CRP –Concepts & applications, Aggregate planning & Master Scheduling, ERP– Concepts and systems.

UNIT V  NETWORK MODELS  

OUTCOMES: 
Upon completion of the course, the student will be able to:
- Discuss the working of printing organization
- Apply various management concepts in managing a print establishment.
- Critically analyze the print operations management concepts to solve management problems.

TEXT BOOKS:

REFERENCE: 

PT7603  WEB OFFSET TECHNOLOGY  L T P C
3 0 0 3

OBJECTIVE: 
- To understand the paper feeding mechanisms, web tension controls, dampening and inking systems, press configurations, registering mechanisms and settings involved in a web offset printing machine.

UNIT I  PRESS CLASSIFICATION AND INFEED UNITS  
Development, Classification – blanket-to-blanket, in-line, common impression; Job suitability and factors to be considered for selection, presses – Full size, narrow web presses and continuous stationery; Roll stands; Automatic pasters – Zero speed and Flying pasters; Web pre-conditioners, infeed units, dancing roller types, design, tension control systems. Reel handling and storage; Requirements of paper-roll and web.

UNIT II  PRINTING UNIT  
Printing Unit – plate cylinder, blanket cylinder, lock-up mechanisms, cylinder pressure and timing, unit configuration, webbing up options; Automatic webbing up device, control of fan out using buzzle wheels and air guns; web aligner concepts; Web break detectors &Severers; Cylinder
drives; Circumferential and lateral movement of plate cylinder; Automatic register control system, concepts and design; Shaft less drives, automation in closed loop controls.

UNIT III  INKING & DAMPENING SYSTEMS  9

UNIT IV  DRYING, CHILLING, FOLDING AND SHEETING UNITS  9

UNIT V  MAIL ROOM OPERATION  8
Products, sizes, formats, sections. Pagination, single/double/quadruple production, speed, time schedules, conveyor system, counter stackers, wrapping requirements, strapping requirements. Bundle addressing, system and control, online trimmers, copy counting mechanisms, Programming and Telescopic conveyor for truck loading, copy storage system, Inserting, Diverters & Kickers

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Analyze different configurations, components and mechanisms of a web offset machine
- Identify and solve problems related to runnability and printability of substrates
- Ensure conformance to quality standards.

TEXT BOOKS:

REFERENCES:
PT7611 COLOR REPRODUCTION AND MANAGEMENT LABORATORY

OBJECTIVES:
- To understand the influence of device settings in image acquisition and learn the tonal and colour adjustments
- To understand colour management options in various stages of prepress workflow

EXERCISES:
1. Monitor calibration, profiling and colour management settings in prepress software
2. Image editing using curves
3. Colour correction
4. Image Retouching
5. Colour management options in PDF and RIP software
6. Proofer Profiling, Proofing and Proof evaluation
7. Colour separation using UCR, GCR
8. Colour reproduction analysis using quality control aids
9. Colour reproduction comparison using various substrates
10. Colour reproduction evaluation - ISO standards

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Preflight and export colour documents into PDF
- Generate profiles for different devices
- Obtain proofs by mapping to destination device gamut.
- Ensure device independent colour reproduction with best possible color match

PT7612 PACKAGE DESIGN AND TESTING LABORATORY

OBJECTIVES:
Become acquainted with the nature and impact of visual communications in packaging design
- To familiarize with the various graphic design and 3D Modeling software
- To conduct various characterization tests for packaging materials

EXERCISES:
1. Graphic design for packaging applications
2. Structural design for packaging applications
3. Integration and visualization of structural and graphic designs
4. Designing for labels and folding cartons
5. Designing for flexible pouches and metal cans
6. Designing for multiple-ups
7. Determination of tensile and compression strength
8. Determination of stiffness and burst strength
10. Determination of permeability of packaging materials

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Design different types of packages
- Test packaging materials
- Optimize material usage in package design
PT7613  MINI PROJECT  L T P C  
0 0 2 1

OBJECTIVE:
- To provide opportunity for the students to implement their skills acquired in the previous semesters to face practical problems.

The students in convenient group’s not exceeding 4 members have to take one small work related to printing and its process. Every project work shall have a guide who is the member of the faculty of the institution and if possible with an industry guide also. The work chosen may be printing elements (Example-press, prepress, post press and etc). The students are required to demonstrate its working apart from submitting the project report.

TOTAL: 30 PERIODS

OUTCOME:
- On completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

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PT7701  ELECTRONIC PUBLISHING  L T P C  
3 0 0 3

OBJECTIVES:
- To understand the Print On-demand and online publishing concepts.
- To learn design concepts and styles of layout for various digital gadgets.
- To impart knowledge on different e-publishing and workflow software.
- To familiarize online publishing models and digital rights management.

UNIT I  INTRODUCTION  8

UNIT II  PUBLISHING  9

UNIT III  WORKFLOW  9
Authors, Publishers, e Publishing Companies; Workflow – Receiving Jobs (FTP), Pre-editing, Copy editing, Proof reading, Graphics, Pagination, Quality Control, Output – Print, Proof, Web, Handheld devices(file formats) ; Workflow softwares, Publishing Management System: Publication representation; Publication environments; Publication node structure; Version management; Content objects & processing objects; Publication naming; Information sharing Hypertext and its principle.

UNIT IV  SOFTWARES & TOOLS  10
UNIT V EMERGING TRENDS
Future publishing Models, Digital Asset Management, Digital Rights Management, Business models in Internet, Marketing, Recent trends

OUTCOMES:
Upon completion of the course, the student will be able to:
- Apply different layouts design for various digital gadgets.
- Choose proper software for web presentation and transformation language.
- Construct different online publishing models.

TEXT BOOKS:

REFERENCES:

PT7702 PRINT FINISHING

OBJECTIVE:
- To impart knowledge on various finishing operations, machines and materials used for print finishing

UNIT I BINDING MATERIALS
Overview of binding and finishing; Print finishing – classification; materials; JDF and MIS in book binding and print finishing, trends and developments in finishing operations; adhesives – types, manufacturing, theory of adhesion; prevention of deterioration; Production control, Network analysis and Quality control.

UNIT II GUILLOTINES
Joggers; cutting – overview, work preparation; cutting machine – parts, types of motion; Principles of single knife guillotines, semi-automatic and automatic programming systems, three knife trimmers; operation, mechanism and maintenance of guillotines; various adjustments; operational procedure of sensors and hydraulic systems; problems and remedies during cutting.

UNIT III FOLDING
Principles of folding, types of folding for sheet and web, methods of feeding and delivery; folding production line, folding terminology, folding diagram, folding scheme; problems involving folding; mechanism, operation and adjustment of folding machines; additional features – fold gluing, perforators, creasers and slitters.

TOTAL: 45 PERIODS
UNIT IV  GATHERING AND SECURING OPERATION
Principles of gathering, types of machines, feeders, delivery, inline production; Securing – types, characterization; stitching – wire and thread; adhesive binding; sewing – types, feeders and delivery; mechanical and loose leaf binding; materials, styles, purpose of each method.

UNIT V  MISCELLANEOUS FINISHING OPERATION AND AUTOMATION IN BINDING

OUTCOMES:
Upon completion of the course, the student will be able to:
- Choose appropriate materials and print finishing operations for different applications
- Analyze the mechanism and maintenance activities of the print finishing machines
- Identify suitable type of binding based on application

TEXT BOOKS:

REFERENCES:
1. Ralph Lyman, Binding and finishing, GATF, 1993
3. Arthur W. Johnson, Book Binding, Thames and Hudson, 1984

OBJECTIVES:
- To understand various technologies in creating a website
- Explore various style sheets to adapt for various gadgets
- Learn to include different media in websites.

EXERCISES:
1. Creating Simple web page design with CSS
2. Scripting – Simple applet design
3. Animation techniques
4. Creating 2D animation
5. 3D animation
6. Audio & Video editing
7. Authoring software
8. Cross Media designing and publishing
9. Online publishing- blog, forum and newsletter
10. Creating templates for e-learning

TOTAL: 60 PERIODS
OUTCOMES:
Upon completion of the course, the student will be able to:
- Design simple and dynamic web pages
- Build complete website with database on back end.
- Build and embed the web page with many media
- Construct a style sheet for different gadgets.

PT7712 PRINT FINISHING LABORATORY

OBJECTIVES:
- To impart practical knowledge on various securing operations, case making
- To study the controls, operations and mechanisms of various print finishing equipments.

I STUDY OF VARIOUS CONTROLS, OPERATION AND MECHANISMS OF
1. Programmable Cutting Machine
2. Folding Machine
3. Perfect Binding Machine
4. Wire Stitching Machine
5. Lamination Machine (Wet and Dry types)

II MECHANICAL AND LOOSE LEAF BINDING
1. Comb binding
2. Spiral binding
3. Wire-o-binding

III PREPARATION OF
1. End Papers
2. Case Bound
3. Perfect Bound
4. Saddle and Side stitch Binding

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Do various print finishing and binding processes
- Operate print finishing machines and analyze their mechanisms

PT7713 PRINT PRODUCTION PROJECT WORK

OBJECTIVES:
- To integrate the knowledge acquired in previous theory & practical courses & implement them by producing printed products

The students should work in convenient groups of not more than four members in a group to design and produce printed products right from premedia to finishing; including planning, material selection, designing, image carrier preparation, scheduling, printing, quality assurance, finishing and cost estimation.

The training will be coordinated by a faculty member of the Department. Eight periods per week shall be allotted in the time table. Each student shall finally produce printed products and
comprehensive report. The continuous assessment and semester evaluation will be based on the regulation.

TOTAL: 120 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Plan, estimate and design optimal job sequence for commercial printing.
- Produce innovative printed products by using optimum print production stages.
- Evaluate the printed products as per quality standards.

OBJECTIVE:
- To experience and understand real life situations in industrial organizations and their related environments and accelerating the learning process of how student’s knowledge could be used in a realistic way.

DURATION:
The students have to undergo practical industrial training for four weeks (in second and third year holidays) in industrial establishments.

I. At the end of the training they have to submit a report with following information:
1. Profile of the Industry
2. Product range
3. Organization structure
4. Plant layout
5. Processes/Machines/Equipment/devices
6. Personnel welfare schemes
7. Details of the training undergone
8. Projects undertaken during the training, if any
9. Learning points.

II. End Semester examination will be a Viva-Voce Examination

OUTCOME:
Upon completion of the course, the student will be able to:
- Be aware of various new technologies and process involved in printing and packaging industries

OBJECTIVES:
- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
• To train the students in preparing project reports and to face reviews and viva voce examination.

A Project topic must be selected by the students in consultation with their guides. The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design and fabrication of a device for a specific application, a research project with a focus on an application needed by the industry/society, a computer project, a management project or a design project.

The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiner

TOTAL: 300 PERIODS

OUTCOME:
• On completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

CS7023 KNOWLEDGE MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
• To learn about Knowledge Engineering Methodology
• To understand organizational context and identify knowledge bottlenecks
• To know about Knowledge Model Construction
• To Understand the techniques of Knowledge Management and Implementation

UNIT I INTRODUCTION
The value of Knowledge – Knowledge Engineering Basics – The Task and Organizational Content – Knowledge Management – Knowledge Management Ontology.

UNIT II KNOWLEDGE MODELS

UNIT III TECHNIQUES OF KNOWLEDGE MANAGEMENT
Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV KNOWLEDGE SYSTEM IMPLEMENTATION

UNIT V ADVANCED KNOWLEDGE MANAGEMENT

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• To Design Knowledge systems
• To Construct Common KADS model
• To implement knowledge management by Elucidating knowledge
• To develop an application using Knowledge Management Tools
TEXTBOOKS:

REFERENCES:
2. http://www.epistemics.co.uk

CS7071 DATA WAREHOUSING AND DATA MINING L T P C
3 0 0 3

OBJECTIVES:
- To make the students to understand data mining principles and techniques
- To discover the knowledge imbibed in the high dimensional system.
- To study algorithms for finding the hidden interesting patterns in data.
- To expose the students to the concepts of Data warehousing Architecture and Implementation.
- To study the overview of developing areas – Web mining, Text mining and Big Data Mining Tools of Data mining.

UNIT I INTRODUCTION TO DATAWAREHOUSING

UNIT II DATAWAREHOUSE PROCESS AND ARCHITECTURE
Types of OLAP Servers, 3 –Tier Data Warehouse Architecture, Distributed and Virtual Data Warehouses. Data Warehouse Implementation, Tuning and Testing of Data Warehouse, Data Staging (ETL) Design and Development, Data Warehouse Visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview - Data Warehousing and Business Intelligence Trends - Business Applications - Tools - SAS

UNIT III INTRODUCTION TO DATA MINING
Data Mining - KDD versus Data Mining, Stages of the Data Mining Process- Task Primitives, Data Mining Techniques - Data Mining Knowledge Representation – Data Mining Query Languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data Cleaning, Data Transformation, Feature Selection, Dimensionality Reduction, Discretization and Generating Concept Hierarchies - Mining Frequent Patterns Association- Correlation.

UNIT IV CLASSIFICATION AND CLUSTERING
Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Clustering techniques – Partitioning Methods - k-means-Hierarchical Methods - Distance-based Agglomerative and Divisible Clustering, Density-Based Methods – Expectation Maximization - Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis.
UNIT V TRENDS IN DATAMINING AND BIG DATA MINING

Introduction to Big Data–Case Studies on Big Data Mining Tools: Apache Hadoop, Apache Mahout and R - Mining Complex Data Objects, Spatial Databases, Temporal Databases, Multimedia Databases, Time Series and Sequence Data; Text Mining – Web Mining- Application and Trends in Data Mining

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To build a data warehouse for a real-world system
- To write programs for classification and clustering
- To evaluate various mining techniques on complex data objects
- To develop applications using Big Data Mining Tools.

TEXTBOOKS:

REFERENCES:

CS7073 MULTIMEDIA TOOLS AND TECHNIQUES

OBJECTIVES:
- To comprehend the building blocks of multimedia, with emphasis on authoring, data compression, web and mobile applications of multimedia with an added exposure to some of the popular tools / software.

UNIT I BASIC ELEMENTS

UNIT II MULTIMEDIA ON THE WEB

UNIT III AUTHORING and TOOLS
Authoring – Story Boarding, Metaphors - Card / Page, Icon, Timeline, Tools – Adobe Dream Weaver CC, Flash, Edge Animate CC, Camatasia Studio 8, Claro, E-Learning Authoring Tools – Articulate, Elucidate, Hot Lava.
UNIT IV DATA COMPRESSION

UNIT V MULTIMEDIA APPLICATIONS
Multimedia Databases – Content Based Information Retrieval, Multimedia Communications - Multimedia Information Sharing and Retrieval – Applications – Social Media Sharing, Online Social Networking - Virtual Reality - Multimedia for Portable Devices, Collaborative Multimedia Applications

OUTCOMES:
Upon completion of the course, the students will be able to:
- A grasp on basic elements of multimedia
- Explain the importance of web based multimedia usage
- Use and apply authoring tools for web and e-learning
- Learn the theory behind data compression both lossless and lossy
- Implement applications

TEXTBOOKS:

REFERENCES:
4. www.Webstyleguide.com

CS7075 WEB DESIGN AND MANAGEMENT

OBJECTIVES:
- To learn the concepts of Web design patterns and page design.
- To understand and learn the scripting languages with design of web applications.
- To learn the maintenance and evaluation of web design management

UNIT I SITE ORGANIZATION AND NAVIGATION

UNIT II ELEMENTS OF PAGE DESIGN
UNIT III  SCRIPTING LANGUAGES AND ANIMATION USING FLASHF 9
ASP/JSP  Designing a Simple Web Application - Introduction to MACROMEDIA FLASH,
Importing Other File Formats to Flash – Saving and Exporting Flash Files, Frame by
Frame Animation–Motion Tweening – Shape Tweening.

UNIT IV  PRE-PRODUCTION MANAGEMENT 9
Principles of Project Management – Web Project Method – Project Road Map – Project
Clarification – Solution Definition – Project Specification – Content – Writing and Managing
Content.

UNIT V  PRODUCTION, MAINTENANCE AND EVALUATION 9
Design and Construction – Testing, Launch and Handover – Maintenance – Review and
Evaluation – Case Study: Using the Skills and Concepts Learn with the ADOBE IMAGE
READY, DREAM WEAVER, FLASH, and Scripts, Develop Portfolios in the Form of Web
Pages which have to be uploaded in Free Public Domains.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Identify the various issues of web design process and evaluation.
• Determine templates for web pages and layout.
• Develop simple web applications using scripting languages.
• Determine the various issues of web project development.
• Address the core issues of web page maintenance and evaluation.

TEXTBOOKS:

REFERENCES:
2. Van Duyne, Landay and Hong, “The Design of Sites: Patterns for Creating Winning

GE7071  DISASTER MANAGEMENT  L T P C
3 0 0 3

OBJECTIVES:
• To provide students an exposure to disasters, their significance and types.
• To ensure that students begin to understand the relationship between vulnerability,
disasters, disaster prevention and risk reduction
• To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
• To enhance awareness of institutional processes in the country and
• To develop rudimentary ability to respond to their surroundings with potential
disaster response in areas where they live, with due sensitivity

69
UNIT I  INTRODUCTION TO DISASTERS  9
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don’ts during various types of Disasters.

UNIT II  APPROACHES TO DISASTER RISK REDUCTION (DRR)  9
Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III  INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT  9
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV  DISASTER RISK MANAGEMENT IN INDIA  9
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V  DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS  9
Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

OUTCOMES:
The students will be able to
- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

TEXTBOOKS:

REFERENCES
1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005
GE7074          HUMAN RIGHTS          L  T  P  C
                          3  0  0  3

OBJECTIVES :

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I

UNIT II

UNIT III
Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV
Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

TOTAL : 45 PERIODS

OUTCOME :

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

GE7652          TOTAL QUALITY MANAGEMENT          L  T  P  C
                          3  0  0  3

AIM

- To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES

- To understand the need for quality, its evolution, basic concepts, contribution of quality gurus, TQM framework, Barriers and Benefits of TQM.
- To understand the TQM Principles.
- To learn and apply the various tools and techniques of TQM.
- To understand and apply QMS and EMS in any organization.
UNIT I  INTRODUCTION
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality –Definition of TQM-- Basic concepts of TQM —Gurus of TQM (Brief introduction) -- TQM Framework- Barriers to TQM –Benefits of TQM.

UNIT II  TQM PRINCIPLES

UNIT III  TQM TOOLS & TECHNIQUES I

UNIT IV  TQM TOOLS & TECHNIQUES II

UNIT V  QUALITY MANAGEMENT SYSTEM

TOTAL: 45 PERIODS

OUTCOMES:

• Ability to apply TQM concepts in a selected enterprise.
• Ability to apply TQM principles in a selected enterprise.
• Ability to apply the various tools and techniques of TQM.
• Ability to apply QMS and EMS in any organization.

TEXT BOOK:

REFERENCES:
IE7071  HUMAN RESOURCE MANAGEMENT  L T P C  3 0 0 3

OBJECTIVE:
- To introduce the basic principles of group dynamics and associated concepts required for Human resource management in organizations

UNIT I  INDIVIDUAL BEHAVIOR  9

UNIT II  GROUP BEHAVIOR  9
Group Organization, Group Dynamics, Emergence of Informal Leader, Leadership Styles-theories, Group decision making, Inter personal Relations, Communication -Team.

UNIT III  DYNAMICS OF ORGANIZATIONAL BEHAVIOR  9
Organizational Climate, the Satisfactory – Organizational change – The Change Process and Change Management.

UNIT IV  HUMAN RESOURCES PLANNING  9
Requirements of Human Resources – HR audit, Recruitment-Selection-Interviews

UNIT V  HUMAN RESOURCES DEVELOPMENT  9
Employee Training-Career Development-Performance Appraisal- Compensation- safety and Health-Employee Relation-Management Development – Employee retention.  TOTAL : 45 PERIODS

OUTCOMES:
- To understand the process of effective Human Resource Management.

TEXT BOOK:

REFERENCES:

IE7072  METROLOGY AND INSPECTION  L T P C  3 0 0 3

OBJECTIVE:
- To impart knowledge about linear and angular measuring Instruments.

UNIT I  LINEAR MEASUREMENT AND ANGULAR MEASUREMENT  9

UNIT II  STANDARDS FOR LINEAR AND ANGULAR MEASUREMENTS  9
Shop floor standards and their calibration, light interference, Method of coincidence, Slip gauge calibration, Measurement errors, Limits, fits, Tolerance, Gauges, Gauge design.
UNIT III MEASUREMENT APPLICATION

UNIT IV MODERN CONCEPTS
Image processing and its application in Metrology, Co-ordinate measuring machine, Types of CMM, Probes used, Application, Non-contact CMM using Electro-optical sensors for dimensional metrology.

UNIT V INTRODUCTION TO MEASUREMENT SYSTEMS
System configuration, basic characteristics of measuring devices, Displacement, force and torque measurement, standards, Calibration, Sensors, Basic principles and concepts of temperature, Pressure and flow measurement, Destructive testing – Nondestructive testing.

OUTCOMES:
The student must be able to
- Understanding the basic theoretical technical and legislative aspects of metrology and testing.
- Measure a variety of engineering parts using a variety of measuring techniques.
- Present and analyze measurement results obtained.
- Acquire capability to select right method of non-destructive testing.

TEXT BOOK:

REFERENCES:
UNIT V SPECIAL TOPICS IN PROJECT MANAGEMENT 9
Project management for modern information system – critical success factors for IT project - software project selection and initiation - project management discipline – project overall planning

TOTAL: 45 PERIODS

OUTCOMES:
- Evaluate and select the most desirable projects.
- Apply appropriate approaches to plan a new project.
- Apply appropriate methodologies to develop a project schedule.
- Identify important risks facing a new project.

REFERENCES:

IE7074 SAFETY ENGINEERING AND MANAGEMENT L T P C
3 0 0 3

OBJECTIVE:
- To impart knowledge on safety engineering fundamentals and safety management practices.

UNIT I INTRODUCTION 9
Evolution of modern safety concepts – Fire prevention – Mechanical hazards – Boilers, Pressure vessels, Electrical Exposure.

UNIT II CHEMICAL HAZARDS 9
Chemical exposure – Toxic materials – Radiation Ionizing and Non-ionizing Radiation - Industrial Hygiene – Industrial Toxicology.

UNIT III ENVIRONMENTAL CONTROL 9
Industrial Health Hazards – Environmental Control – Industrial Noise - Noise measuring instruments, Control of Noise, Vibration, - Personal Protection.

UNIT IV HAZARD ANALYSIS 9
System Safety Analysis –Techniques – Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), HAZOP analysis and Risk Assessment.

UNIT V SAFETY REGULATIONS 9

TOTAL: 45 PERIODS

OUTCOMES:
Students will be able to
- Identify and prevent chemical, environmental mechanical, fire hazard
- Collect, analyze and interpret the accidents data based on various safety techniques.
- Apply proper safety techniques on safety engineering and management
- Design the system with environmental consciousness by implementing safety regulation
REFERENCES:

IT7071 DIGITAL IMAGE PROCESSING

OBJECTIVES:
- To learn about the basic concepts of digital image processing and various image transforms.
- To familiarize the student with the image enhancement techniques.
- To expose the student to a broad range of image processing techniques and their applications.
- To appreciate the use of current technologies those are specific to image processing systems.
- To expose the students to real-world applications of image processing.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING
Introduction – Applications of Image Processing - Steps in image processing Applications - Digital imaging system - Sampling and Quantization - Pixel connectivity – Distance measures - Color fundamentals and models - File Formats, Image operations.

UNIT II IMAGE ENHANCEMENT AND IMAGE RESTORATION

UNIT III MULTI RESOLUTION ANALYSIS AND COMPRESSION

UNIT IV IMAGE SEGMENTATION AND FEATURE EXTRACTION

UNIT V IMAGE CLASSIFICATION AND APPLICATIONS OF IMAGE PROCESSING

TOTAL: 45 PERIODS
OUTCOMES:
On Completion of the course, the students should be able to:

- Implement basic image processing algorithms
- Design an application that uses different concepts of Image Processing
- Apply and develop new techniques in the areas of image enhancement- restoration- segmentation- compression-wavelet processing and image morphology.
- Critically analyze different approaches to different modules of Image Processing.

TEXT BOOKS:

REFERENCES:

ME 7076 ENERGY CONSERVATION IN INDUSTRIES

OBJECTIVES:

- To understand and analyse the energy data of industries.
- To carryout energy accounting and balancing.
- To conduct energy audit and suggest methodologies for energy savings.
- To utilise the available resources in optimal ways.

UNIT I INTRODUCTION

UNIT II ECONOMICS

UNIT III ELECTRICAL SYSTEMS

UNIT IV THERMAL SYSTEMS

UNIT V ENERGY CONSERVATION IN MAJOR UTILITIES
Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems - Cooling Towers – D.G. sets

TOTAL:45 PERIODS
**OUTCOMES:**
Upon completion of this course, the students will be able to:
- Analyse the energy data of industries.
- Carry out energy accounting and balancing.
- Suggest methodologies for energy savings.

**TEXT BOOK:**

**REFERENCES:**

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**ME7077 ENTREPRENEURSHIP DEVELOPMENT**

**OBJECTIVES:**
- The students will be provided with an understanding of the scope of an entrepreneur, key areas of development, financial assistance by the institutions, methods of taxation and tax benefits, etc.

**UNIT I ENTREPRENEURSHIP**

**UNIT II MOTIVATION**

**UNIT III BUSINESS**

**UNIT IV FINANCING AND ACCOUNTING**
UNIT V   SUPPORT TO ENTREPRENEURS

OUTCOME:
- Upon completion of the course, the students will be able to gain knowledge and skills needed to run a business successfully.

TEXT BOOKS:

REFERENCES:

ME 7078    INTRODUCTION TO OPERATIONS RESEARCH   L   T   P   C
            3   0   0   3

OBJECTIVE:
- To introduce the concepts in optimization of resources for manufacturing and service based industries.

UNIT I   LINEAR PROGRAMMING PROBLEMS
OR-Definition - Phases - models, LP problems formulation – Graphical solution, GLPP, Standard and Canonical forms of LPP- simplex methods- Big M, Two phase methods, Alternate optimal solutions, Duality in LP.

UNIT II   TRANSPORTATION
Transportation problems- Basic feasible solution, Optimal solution By MODI method, Balanced and Unbalanced TP, Degeneracy, Production problems. Assignment problems – Hungarian method Traveling salesman problems - Sequencing models- Johnson algorithm, n job 2 machines, n job 3 machines and n job m machines.

UNIT III   INVENTORY CONTROL
Types of inventory- Inventory cost - EOQ - Deterministic inventory problems – Purchase and Production models with and without shortages-EOQ with price breaks - Stochastic inventory problems - Multi product problems - Systems of inventory control (P and Q Systems)- Determination of buffer stock and re-order levels -Selective inventory control techniques (ABC, VED, SDE, etc.)

UNIT IV   QUEUING THEORY
Queueing system - Characteristics - symbols - Poisson process and exponential distribution -Single server queuing models - Multiserver queuing models, Simulation Monte Carlo technique- Inventory & Queuing problems.
UNIT V PROJECT MANAGEMENT AND REPLACEMENT MODELS

Project management: Network logic – Ford-Fulkerson’s rule - AON diagram - CPM and PERT techniques, Critical path and float calculations
Replacement models -types of failures – Gradual failures-replacement of items: Efficiency deteriorates with time, sudden failures- individual and group replacement policies.

OUTCOME:
Upon completion of this course, the students will be able to:
• Understand and apply the operations research techniques in industrial operations.

TEXT BOOKS:

REFERENCES:

ME 7079 LEAN SIX SIGMA L T P C
3 0 0 3

OBJECTIVE:
• To impart the knowledge of tools & techniques used in lean manufacturing and six sigma.

UNIT I EVOLUTION AND OVERVIEW OF LEAN MANUFACTURING

UNIT II LEAN MANUFACTURING – TOOLS AND TECHNIQUES
3Ms – Muda, Mura, Muri, 7 Wastes in Manufacturing, Lean Tools to eliminate Muda - 5S, Standardised work, TPM, SMED, Jidoka – Poka Yoke, JIT, Heijunka, Kanban, One piece production.

UNIT III VALUE STREAM MAPPING
Need for Value Stream mapping; Steps involved in Value stream mapping – Choose value stream – PQ and PR analysis, Current State map, Lean Metrics, Future State Map, Kaizen plans; Lean implementation - Cultural change, Lean in the Supply chain.

UNIT IV SIX SIGMA – TOOLS AND TECHNIQUES
Cost of Quality – Conformance and Non-Conformance cost, Seven Basic Quality Control Tools, Seven Management tools, FMEA.
UNIT V  
SIX SIGMA METHODOLOGY  
Need for Six Sigma, Six Sigma Team, DMAIC Methodology - Define, Measure, Analyse, Improve and Control; Lean Six Sigma.

OUTCOME:
Upon completion of this course, the students will be able to:
- Apply the various tools, techniques and methodology of lean manufacturing and six sigma concepts to the potential quality gaps in manufacturing / production industries.

TEXT BOOKS:
1. Pascal Dennis, “Lean production Simplified: A plain language guide to the world’s most powerful Production system”, Productivity Press 2007

REFERENCES:
2. Taiichi Ohno, Toyota “Production System: Beyond Large-Scale Production”, Productivity Press 1988

ME7080  
MARKETING MANAGEMENT  
L T P C  
3 0 0 3

OBJECTIVE:
- To expose the students to newer concepts of marketing principles like strategic marketing concepts, segmentation, pricing, advertisement and strategic formulation.

UNIT I  
CONCEPTS IN MARKETING  

UNIT II  
BUYING BEHAVIOUR AND MARKET SEGMENTATION  
Cultural, Demographic factors, Motives, Types, Buying Decisions, Segmentation factors, Demographic, Psycho graphic and Geographic Segmentation, Process, Patterns. Services marketing and Industrial marketing.

UNIT III  
PRODUCT, PRICE AND MARKETING RESEARCH  

UNIT IV  
MARKETING PLANNING AND STRATEGY FORMULATION  
UNIT V    ADVERTISING, SALES PROMOTION & DISTRIBUTION  9

OUTCOME:
Upon completion of this course, the students will be able to:
• Understand the philosophies of marketing and should able to formulate market planning, strategies and could promote sales in effective manner.

TEXT BOOKS:

REFERENCES:

ME7083    SUSTAINABLE AND GREEN MANUFACTURING  L T P C
3 0 0 3

OBJECTIVES:
• To inculcate the knowledge of sustainability in manufacturing.
• To learn the basis involved in Green manufacturing, recycling and life cycle assessment.

UNIT I    INTRODUCTION TO SUSTAINABLE MANUFACTURING  9
Sustainable Manufacturing - Concept of Triple bottom line, Environmental, Economic and Social Dimensions of Sustainability, Sustainable Product Development – Various Phases.

UNIT II    EVALUATING SUSTAINABILITY  9
Sustainability performance evaluators- Frameworks and techniques - environmental management systems - life cycle assessment - strategic and environmental impact assessments - carbon and water foot-printing.

UNIT III    MANUFACTURING STRATEGY FOR SUSTAINABILITY  9

UNIT IV    GREEN MANUFACTURING  9
UNIT V RECYCLING
Reclamation and recycling of waste- Recycling as Universal resource policy- Innovation towards environmental sustainability – systematic framework for conscious design- International green manufacturing standards and compliance.

OUTCOME:
Upon completion of this course, the students will be able to:
- Formulate strategy for sustainable manufacturing, implement green manufacturing, follow environmental norms in manufacturing and perform lifecycle assessment.

TEXT BOOKS:

REFERENCES:
6. Joseph Sarkis “Greener manufacturing and operations: from design to delivery and back” Greenleaf Pub., 2001

MF7075 INDUSTRIAL ROBOTICS

OBJECTIVES:
- To understand the functions of the basic components of a Robot.
- To study the use of various types of End of Effectors and Sensors.
- To impart knowledge in Robot Kinematics and Programming.
- To learn Robot safety issues and economics.

UNIT I FUNDAMENTALS OF ROBOT

UNIT II ROBOT DRIVE SYSTEMS AND END EFFECTORS
Pneumatic Drives - Hydraulic Drives - Mechanical Drives - Electrical Drives - Stepper Motors, Servo Motors - Salient Features, Applications and Comparison of all these drives. End Effectors - Grippers - Mechanical Grippers, Pneumatic and Hydraulic - Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.
UNIT III  SENSORS AND MACHINE VISION  9

UNIT IV  ROBOT KINEMATICS  9
Forward Kinematics and Inverse Kinematics, Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 & 3 Dimension), Co-ordinate reference frame, Velocity and Forces - Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design - Derivations and problems.

UNIT V  ROBOT PROGRAMMING AND ROBOT ECONOMICS  9
Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effectors commands and simple Programs. RGV, AGV: Implementation of Robots in Industries - Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply the basic engineering knowledge for the design of robotics.

TEXT BOOKS:

REFERENCES:

MF7076  NANOTECHNOLOGY  L T P C
3 0 0 3

OBJECTIVES:
At the end of this course the students are expected to understand the general issues relating to nanotechnology and nanofabrication.
- Methods for production of Nanomaterials.
- Characteristic techniques of Nanomaterials.

UNIT I  INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY  9
History, background scope and interdisciplinary nature of nanoscience and nanotechnology, scientific revolutions. Definition of Nanometer, Nanomaterials, and Nanotechnology. Concepts of nanotechnology - size dependent phenomena, surface to volume ratio, atomic structure, molecules and phases, energy at the nanoscale molecular and atomic size.
UNIT II SYNTHESIS NANOMATERIALS AND PROCESSING OF NANOMATERIALS BY PHYSICAL METHODS


UNIT III PROCESSING OF NANOMATERIALS BY CHEMICAL METHODS

Chemical precipitation methods - co-precipitation, arrested precipitation, sol - gel method, chemical reduction, photochemical synthesis, electrochemical synthesis, Microemulsions or reverse micelles, Sonochemical synthesis, Hydrothermal, solvothermal, supercritical fluid process, solution combustion process, spray pyrolysis method, flame spray pyrolysis, gas phase synthesis, gas condensation process, chemical vapor condensation. Fundamental aspects of VLS (Vapor-Liquid-Solid) and SLS (SolutionLiquid-Solid) processes - VLS growth of Nanowires - Control of the size of the nanowires - Precursors and catalysts - SLS growth - Stress induced recrystallization.

UNIT IV LITHOGRAPHY


UNIT V CHARACTERISATION OF NANOMATERIALS


OUTCOMES:

At the end of this course

- The student will be able to produce nanomaterials using various techniques.
- Use this knowledge to characterize nanomaterials.
- Use this knowledge to fabricate nano-scaled products.

TEXT BOOKS:


REFERENCES:

4. David G. Bucknall. Nanolithography and patterning techniques in microelectronics, CRC
86

MF7077 TOTAL PRODUCTIVE MAINTENANCE L T P C 3 0 0 3

OBJECTIVE:
- To teach the students basic concepts of Total Productive Maintenance. Expose the students to the objectives, maintenance models, group activities, logistics, condition monitoring and implementation of Total Productive Maintenance.

UNIT I MAINTENANCE CONCEPTS 9
Introduction - Objectives and functions – Productivity, Quality, Reliability and Maintainability (PQRM) - Terotechnology - Reliability Centered Maintenance - Predictive Maintenance - Condition Based Maintenance - maintainability prediction - availability and system effectiveness - maintenance costs - maintenance organization.

UNIT II MAINTENANCE MODELS 9
Minimal repair - As Good As New policy - maintenance types - balancing PM and breakdown maintenance - PM schedules: deviations on both sides of target values - PM schedules: functional characteristics - replacement models.

UNIT III TOTAL PRODUCTIVE MAINTENANCE 9
Zero breakdowns - Zero Defects and TPM - maximizing equipment effectiveness – Autonomous maintenance program - five pillars of TPM - TPM small group activities - TPM organization - Management Decision - Educational campaign - Creation of Organizations - Establishment of basic policies and goals - Formation of master plan - TPM implementation.

UNIT IV MAINTENANCE LOGISTICS 9
Human factors in maintenance - maintenance manuals - maintenance staffing methods - queuing applications - simulation - spare parts management - maintenance planning and scheduling.

UNIT V ONLINE MONITORING 9

TOTAL: 45 PERIODS

OUTCOMES:
- Implementation the concept of total productive maintenance to the industries.
- Effectively use the total productive maintenance for online monitoring of processes.

TEXT BOOKS:
REFERENCES:

PT7001 3D PRINTING L T P C
3 0 0 3

OBJECTIVES:
- To impart knowledge on principles of 3D printing techniques
- To understand the applications of 3D printing

UNIT I INTRODUCTION
Introduction; Design considerations – Material, Size, Resolution, Process; Modelling and viewing - 3D; Scanning; Model preparation – Digital; Slicing; Software; File formats

UNIT II PRINCIPLE

UNIT III INKJET TECHNOLOGY
Printer - Working Principle, Positioning System, Print head, Print bed, Frames, Motion control; Print head Considerations – Continuous Inkjet, Thermal Inkjet, Piezoelectric Drop-On-Demand; Material Formulation for jetting; Liquid based fabrication – Continuous jet, Multijet; Powder based fabrication – Colorjet.

UNIT IV LASER TECHNOLOGY
Light Sources – Types, Characteristics; Optics – Deflection, Modulation; Material feeding and flow – Liquid, powder; Printing machines – Types, Working Principle, Build Platform, Print bed Movement, Support structures;

UNIT V INDUSTRIAL APPLICATIONS
Product Models, manufacturing – Printed electronics, Biopolymers, Packaging, Healthcare, Food, Medical, Biotechnology, Displays; Future trends;

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Comprehend 3D printing workflow
- Compare the different types of 3D Printing techniques
- Select appropriate method for designing and modeling applications

TEXT BOOKS:
REFERENCES:
2. Joan Horvath, Mastering 3D Printing, APress, 2014

PT7002 ADVERTISING TECHNIQUES L T P C
3 0 0 3

OBJECTIVES:
- To understand the concepts of Advertising and the role of the media
- To learn about advertising production and business in detail

UNIT I INTRODUCTION
Advertising concept, development and scope of advertising, Economic and Social roles of advertising, legal aspects of advertising, major institutions involved in advertising. Meaning of consumer behavior. How marketing firms use consumer behavior, characteristics of advertising communications, achieving desired responses, stimulating attention and facilitating retention, human needs as a basis for appeals. Role of printing presses in advertising.

UNIT II ADVERTISING PLANNING
Factors involved in advertising planning decision making, basis for advertising Objectives, Methods of Measuring Advertising Effectiveness.

UNIT III ADVERTISING MEDIA AND MEDIA PLANNING
Media concept, structure of media, media characteristics, publication media, TV and Radio, direct mail and POP, out of home advertising. Media planning concept, media decision tools, media plan, media plan strategy, media buying and scheduling. Internet and Mobile Phone Advertising.

UNIT IV ADVERTISING PRODUCTION
Copy concept, copy structure, essentials of a copy, creative approaches and styles, copy testing criteria, types of copy testing, validity and reliability of copy test. Advertising design, layout, visualization, principles of advertising design, contribution of visual elements, what to picture, how to choose colour, test of a good layout, production of print advertising, production of TV/Radio commercials.

UNIT V ADVERTISING BUSINESS AND COORDINATION
Historical development, advertising agencies, special service groups. Coordination with personal selling and distribution channels, cooperative advertising and public relation, advertising and product management. Advertising campaign concept, variable data advertising, planning and execution of campaign, evaluation of the campaign.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Analyze the importance of advertising.
- Analyze the functioning of an advertising agency
- To use the advertising production knowledge to create advertisements
- Develop media planning and campaigning solutions.

TEXT BOOKS:
REFERENCES:

OBJECTIVE:
- To impart knowledge on areas of publishing, editorial process, production management, distribution methods and legal aspects involved in book publishing.

UNIT I PUBLISHING ORGANISATION
Areas of publishing – General publishing, Educational publishing, Professional publishing, Reference publishing, Publishing textbooks for children; Publishing house role – Commissioning editor, Desk editor, Designer, Production manager, Sales/Marketing manager, Publishing manager.

UNIT II EDITORIAL PROCESS AND DEVELOPMENT
Copy editing, Page makeup, Proofs; Book editor – Multipurpose functions; Discussion with author, Editing educational material, Decision making role; Editorial technique – Style sheet, Reference aids; Author and his manuscript – Unsolicited manuscripts; Author – Publisher relationship, Professional guides and Societies, Literary agency.

UNIT III PRODUCTION & ESTIMATING IN BOOK PUBLISHING
Pre-production planning, manuscript, layout & design, imposition, composition, anatomy of books; Printing techniques; Production process; Technical aspects of production; Quality control – proofing stage; Finishing operations; Financial aspects; First copy cost, manufacturing cost, overheads; Economics of publishing – net book, non-net book, variation in price, published price of the book.

UNIT IV PROMOTION CHANNELS, DISTRIBUTION OUTLETS AND SALES TECHNIQUES
Direct promotion techniques, mail order advertising, subscription books, direct mail promotion, library purchases, export and import of books, publishers and booksellers catalogues, publicity campaign, paperback distribution, the central book clearing house, economics of distribution, the role of booksellers, book marketing council, book development council.

UNIT V DIGITAL PUBLISHING AND LEGAL ASPECTS OF BOOK PUBLISHING
Software needs, manuscript formats and file management, editing tools, web design and publishing; copy right, types of agreement between author and publishers, agreement of sale of translation rights, illustration and artwork agreement, the outright sale of the copyright, profit sharing agreement, the royalty system, commission agreement.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Identify the responsibilities and functions of publishing house.
- Analyze the author publisher relationship and editor’s functions.
- Analyze book distribution and copyright agreements.
TEXT BOOKS:

REFERENCES:

PT7004 COLOUR MANAGEMENT

OBJECTIVES:
Upon completion of the course, the student will be able to:
- Understand the variables in colour reproduction workflow.
- Learn the fundamentals of colour management system.
- Resolve issues in colour workflows

UNIT I COLOUR MANAGEMENT
Need for color management, Device characteristics, Closed and Open loop color control, International color consortium – standards, profiles, profile types; Color Management - Components, steps, workflow; Color measurement devices - types, calibration, accuracy; Viewing conditions.

UNIT II PRESS STANDARDISATION
Variables in printing process, Test forms, Press standardization, Optimization - gravure, flexo, offset, Screen, Digital; ISO standards, GraCOL.

UNIT III CREATION OF PROFILES
Profile structure, Lookup table construction, Test targets, Profiling softwares, Calibration and characterization of scanner, digital camera, monitor, Press and Proofer; Profile quality evaluation; Profile editing.

UNIT IV CONVERSION
CMM - function, static, dynamic; Gamut boundaries, Gamut mapping – influencing factors, algorithms, Rendering Intent; Color Appearance Models

UNIT V WORKFLOW
Color management features - Operating System, Graphic software applications, PDF, RIP; Intermediate color spaces; Color Management workflows – RGB workflow, CMYK workflow, embedded workflow, assumed workflow, Internet workflow, Remote proofing, Hardcopy proofing; Color servers, Device link profiles;

OUTCOMES:
Upon completion of the course, the student will be able to:
- Construct profiles for display, input and output devices.
- Apply appropriate color management settings in pre-press.
- Reproduce and match colour across various devices and software applications
- Analyze advanced concepts in colour management

TOTAL: 45 PERIODS
**TEXT BOOKS:**

**REFERENCES:**
3. Phil Green, Lindsay MacDonald, *Colour Engineering*, John Wiley & Sons Ltd., 2002

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**OBJECTIVES:**
- To impart knowledge on the workflow of digital prepress production and its suitable file formats.
- To provide exposure to the basic concepts of networking, database management and security issues.

**UNIT I WORKFLOW OF DIGITALIZED PRE-PRESS**

**UNIT II NETWORKING**
Data transmission fundamentals, Communication media, Data interfaces; Concepts and principles of computer networks, PAN, LAN, WAN, MAN, Cloud; Network topologies; Network protocols – FTP, TCP/IP; Network node components – Hubs, Bridges, Routers, Gateways, Switches; Internet – principles, Client/Server model.

**UNIT III FILE FORMATS & COMPRESSION TECHNIQUES**
File format – EPS, DCS, JPEG, GIF, TIFF, PNG, PDF. Comparison of file formats; Overview of compression techniques - Lossy & Lossless compression, RLE, Huffman compression, LZW, DCT, Wavelet, Fractal image encoding; Image quality evaluation.

**UNIT IV DATABASE MANAGEMENT**
Database - Types, Database management, Database languages, Query processing, Data storage, Backup & Recovery, Distributed databases, Cloud databases, Data warehousing, Data mining; Security issues, Access control; Digital Asset Management.

**UNIT V SECURITY ASPECTS**

**OUTCOMES:**
Upon completion of the course, the student will be able to:
- Identify individual steps involved in digital prepress production workflow
- Choose suitable file format for images based on publishing mode
- Apply knowledge of networking, security and database management in digital data handling
TEXT BOOKS

REFERENCES
1. Mani Subramanian, Network Management: Principles & Practice, Pearson Education India, 2010

PT7006 DIGITAL MEDIA MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
- To understand the basic concepts of managing digital content.
- To learn the various content protection techniques of digital media.

UNIT I DIGITAL MEDIA 9
Overview of multimedia contents, Content acquisition & development, Product development & design- Designing Publications, Designing content Components, Digital Media Storage, Marketing (Circulation management, Single copy sales), Pricing, Distribution – crossmedia, file download security and sharing.

UNIT II DIGITAL ASSET MANAGEMENT 9
DAM Components, Functions, Relationships with other systems, including ERP, DCM, ECM, DMM, WCM, CMS, CRM and DRM, Metadata, cataloguing, indexing and retrieval- standards for production and content description, Accounting for Authors, Accounting for Acquisition sources.

UNIT III CONTENT PROTECTION TECHNIQUES 9
Encryption, stegnography, watermarking, robustness and implementation, considerations, examples of media protection schemes, CCS, CGMS, HDCP, Type of contents, copyrights, patents, trade marks, trade secrets, licensing agreements, web posting policies, copyright and patent laws, fair uses, privacy regulations, piracy, DMCA, ISP obligations and liabilities.

UNIT IV DIGITAL RIGHTS MANAGEMENT 9
Digital right models, transactions, types of rights and licenses, DRM system architecture, content server, license server, secure platform. Digital Millennium Copyright Act

UNIT V CURRENT ISSUES AND DEVELOPMENT 9
Copyright laws, balance between rights enforcement and fair uses, changing landscape in content distributions, recent enforcement cases. Security Applications-OS, Network, Web page, Online transactions.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Comprehend the principles of digital media dissemination and distribution process.
- Apply the concepts of Content Management System and intellectual property rights for digital content.
- Analyze current issues and development aspects of digital media management
TEXT BOOKS:
2. Dr Andreas Mauthe, Dr Peter Thomas ;Professional Content Management Systems: Handling Digital Media Assets, John Wiley & Sons, 2005.

REFERENCES:
1. John Rice and Brian Mckerman (Editors), Peter Bergman, Creating Digital Content, McGraw-Hill, USA, 2010

PT7007 DIGITAL PRINTING L T P C
OBJECTIVES:
• To understand the components of digital workflow
• To impart knowledge on digital printing techniques

UNIT I DIGITAL DATA HANDLING
File formats – EPS, JPEG, GIF, TIFF, PNG, PDF, Comparison of file formats, Overview of Compression techniques - Lossy& lossless compression; Image quality evaluation; Content Management Systems - DBMS, Data Warehousing, Cloud based systems; Computer networks - Principle, types, components, security.

UNIT II DIGITAL PRINTING WORKFLOW
Digital Printing - Principle, Features, Applications; Data Preparation - Layout components & compatibility, Trapping; Postscript, PDF - standards, features; Workflow - Data Preflight, PDF/X Creation and Output, Colour Management, Proofing, Digital Screening, Ripping, CIP4, JDF;

UNIT III COMPUTER TO PRESS/DIRECT IMAGING
Direct imaging - principle, features, applications; Once Imageable Masters - Principle, types, Press configurations; Re-imagable Masters - Principle, types, Press configurations;

UNIT IV DIGITAL PRINT TECHNOLOGIES
Inkjet presses - Principle, types, press configuration, ink types, ink properties; Electrophotographic - Principle, Imaging Systems, Inking Unit, Fixing and Cleaning, Toner types, toner properties; Thermography - Direct Thermography, Thermal Sublimation Printing Systems, Thermal Transfer Printing Systems;

UNIT V APPLICATION AND ADVANCES
Proofing, VDP (variable data printing), POD (print on demand), Inline post press and finishing operations, Size factor considerations, Costing of digital print jobs, Wastages, Toner recycling, Substrate variety and limitations, Quality Standards, Setup of a digital print house, Case study
TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student will be able to:
- Select suitable digital printing technique and finishing process for print jobs
- Analyze different types of digital presses
- Able to develop standardized PDF documents

TEXT BOOKS:

REFERENCE:

PT7008 DISPLAY AND SIGNAGE PRINTING

OBJECTIVES:
- To understand the types of print products for display and signage industry.
- To learn about the substrates and printing technologies for display and signage industry.

UNIT I INTRODUCTION
Sign and Display Industry Overview; Visual Branding; Marketing Campaigns; Seasonal promotions and one-off events; File formats - DWG, DXF; Plotting; Resolution, Sign Creation Software - Features.

UNIT II MATERIALS
Product Requirements - Durability, Light Fastness, Weather Resistance, Fire Resistance and Retardancy; Types, Properties and applications of signage and display materials - Paper, Paperboard, Corrugated boards, Sublimation transfer papers, Textile, vinyl, polyester, nylon, satin, Metallized Films, Glass, Ceramics; Inks - Aqueous, solvent, UV, Latex; Ink, Substrate Compatibility

UNIT III PRINTING TECHNIQUES
Machine configurations, features - Wide format Inkjet Printing, Thermography, Screen Printing; Selection of printing process - Media Handling, Size, Resolution, Speed, Passes, Colors; Printing Problems - Cockling, Banding, Media Distortion;

UNIT IV CONVERTING
Banner - Pole Pockets, Wind Pockets, Grommets, Taping, Seaming, Welding; Coating; Lamination - Thermal, Pressure Sensitive; Digital Finishing - Knife Cutters, Routers, Creasers, Laser engravers, Heat Sealers; Cut-to-Print Systems;

UNIT V APPLICATIONS
Outdoor Graphics - Building coverings and wraps, Flexface billboards, Backlit signage: day and night, Banners, Fleet graphics, Vehicle wraps, Transit and informational signage; Point-of-Purchase (POP) Displays - Rigid POP displays, 3D POP displays, Open-box packages and displays, In-store promotions; Indoor Graphics - Branding Promotion, Popup displays, Posters, Backlit signage: day and night, Exhibition and event graphics, Floor and window graphics, Backdrops;

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student will be able to:
- Identify the requirements of printed products for signage industry
- Select suitable substrate, printing technology and conversion process.
- Analyze the various applications of display and signage in day-to-day use

TEXT BOOKS:
1. Helmut Kipphan, Handbook of Print Media, GATF, 2001

REFERENCES:

PT7009 MASS COMMUNICATION

<table>
<thead>
<tr>
<th>OBJECTIVES:</th>
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<tr>
<td>- To understand the concepts of verbal and non-verbal communication</td>
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<tr>
<td>- To understand the concepts of broadcast and print journalism</td>
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UNIT I INTRODUCTION
Communication and its types, History and evolution of communication, Communication theories, Verbal and non-verbal communication, formal and informal communication, Role of mass media in society. Current trends in communication

UNIT II NEWS REPORTING AND EDITING
Fundamentals of reporting, news gathering, evaluation, news writing & newsroom procedures, Depth reporting, Trend reporting, Investigative reporting, Economic and Science reporting, Preparation of news copy for publication, Copy reading, Rewriting, Proof reading, Page making, Typography, Picture editing.

UNIT III WRITING
Newspaper feature and magazine, non-fiction writing, writing editorials, analytical articles, reviews, columns, commentaries & analysis.

UNIT IV BROADCAST JOURNALISM
Gathering & reporting news for radio & television. The structure, functions and administration of a news and public affairs department in a broadcast station. Radio/TV station management.

UNIT V AUDIO-VISUAL COMMUNICATION
Audio-visual aids & techniques, use of non-projected and projected aids as black boards, Charts, Graphs, etc. Film appreciation, principles and techniques of various types of communication research.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student will be able to:
- Develop content for different media
- Analyze the functionary of Radio and Television Media
- Use the various tools and techniques for audio visual communication

TEXT BOOKS

REFERENCES:

PT7010 NEWSPAPER AND PERIODICAL PUBLISHING
OBJECTIVES:
- To provide a detailed knowledge on the operations of newspaper and magazine companies.
- To impart knowledge on editorial process, production workflows and the legal issues.

UNIT I NEWSPAPER ORGANISATION & MANAGEMENT
Organizational structure & functions - Owner, editorial organization, management, Incoming materials, financial aspects, Production, advertising, distribution and promotion. Role of copy editors, city editors, news editors, editorial cartoonist, artists, Sunday editor, sports editor, business editor, journalist & reports; editorial responsibilities.

UNIT II NEWS AND EDITING
Basic determinants of News; Impact, unusual and prominent; Additional determinants of news; Conflict, proximity, timeliness, currency, gathering the news, sources of news; Beat system, interviewing, wire services, syndicate, news writing, copy preparation, features & reviews, editorial and opinion column, sports, photo production; Editing - manuscript editing, creative and substantive editing, technical editing.

UNIT III PERIODICAL PUBLISHING
Types of magazines, Difference between writing for a magazine & newspaper, structure of a magazine’s editorial department & roles, Designing a layout for magazine, story design, page design, web design; Redesigning.
UNIT IV  PRODUCTION & WORKFLOW  9
Manuscript from editorial organization: Layout & design, composition; Advertisements, Digital Newsroom, Archival of news; Press & web publishing workflows, RSS, Distributed production workflow; Press, Paper, Finishing; Off-prints and re-prints.

UNIT V  LEGAL ASPECTS  9
The press and the law liabilities, defense against libel, mitigation & damages, Digital Rights Management, Watermarking, Readership strategies & trends, Distribution model for newspapers & magazines, Future developments

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Comprehend the operations of newspaper and magazine companies and their organizational structure
- Analyze the concepts on news and editing
- Assess the production and workflow of newspaper and magazine organizations

TEXT BOOKS

REFERENCES

PT7011  PHYSICS FOR PRINTING TECHNOLOGY  L T P C
3  0  0  3

OBJECTIVE:
- The objective of this course is to introduce the essential principles of physics for printing technology applications.

UNIT I  SURFACE TENSION  9
Surface tension - angle of contact - pressure difference across a liquid surface - excess pressure inside a liquid drop - shape of a liquid surface in a capillary tube - determination of surface tension by capillary tube method - bubble pressure method - Jaeger's method - effect of temperature - examples of surface tension - dynamic surface tension - surfactants - tensiometer.

UNIT II  VISCOSITY  9
Viscosity and coefficient of viscosity - streamline and turbulent flow - Reynold's number - Poiseuille's equation - Stoke's law and terminal velocity - experimental determination of n - Basic viscoelasticity - effect of temperature - measurement - viscoelastic flow - Newtonian and non-Newtonian fluids. Basic physical principles of ink-jet printer - ink droplet - ink gun (principles).
UNIT III MAGNETIC/OPTICAL DATA STORAGE TECHNIQUES

Introduction - magnetic material parameters - magnetic disk memories - optical data storage - phase change recording - magneto-optical data storage - Hi-tech involved in system development - capacity of CD in normal use - advantages of CD - holographic storage - construction of a hologram - reconstruction of a hologram - photorefractive storage.

UNIT IV OPTOELECTRONICS AND DISPLAY DEVICES


UNIT V OPTICAL IMAGE PROCESSING

Introduction to Fourier optics - Fourier transforming properties of lenses - analog optical information processing - Abbe-Porter experiment - optical filters - optical spatial light modulators - conversion of incoherent image into coherent image basics of digital image processing.

TOTAL: 45 PERIODS

OUTCOME:
- The students will have knowledge on the basics of physics related to properties of surface tension, viscosity, optical image processing etc. and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

REFERENCES:

PT7012 PRINTED ELECTRONICS

OBJECTIVES:
- To understand the basics of printed electronics and its applications
- To learn about the materials and printing techniques used in electronic products manufacturing

UNIT I INTRODUCTION

Printing Technology in Electronics Manufacturing, PE Technology and Its Benefits, PE Products and Trends, Lighting, Organic/Inorganic Photovoltaics, Displays, Integrated Smart Systems, RFID, Other Electronics and Components

UNIT II PRINTING TECHNOLOGY

UNIT III MATERIALS FOR PRINTED ELECTRONICS 9
Varieties of Conducting Materials, Metallic Nanoparticles, Metal-Organic Decomposition Ink, Nanowires; Applications to Transparent Conductive Films, Low Temperature Fabrication of Metal Nanowire TCF

UNIT IV SEMICONDUCTORS AND SUBSTRATES 9
Semiconductor Category and History, Organic Semiconductors, Oxide Semiconductors, Other Semiconductors; Substrate-Polymeric film, glass, paper; Barrier Film Technology

UNIT V INTERCONNECTION AND STANDARDS 9
Choice of Interconnection Methods- Soldering, Adhesives; Conductive Adhesives- Isotropic Conductive Adhesives- Anisotropic Conductive Adhesives- Interconnection Reliability; Standards-ISO, IEC, IEE, IPC.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:

- Analyze the suitability of printing processes for various electronic products
- Identify the materials and the techniques involved in printed electronics
- Comprehend the various standards in printed electronics

TEXT BOOKS:
1. Katsuaki Suganuma 'Introduction to Printed Electronics', Springer, 2014

REFERENCES:

PT7013 PRINTING MACHINE DESIGN L T P C
3 0 0 3

OBJECTIVES:
- To gain knowledge on the principles and procedure for designing Mechanical power Transmission components.
- To understand the standard procedure available for Designing Transmission of Mechanical elements
  - To learn to use standard data and catalogues

UNIT I INTRODUCTION 9
Introduction to the design process - factors influencing machine design, selection of materials based on mechanical properties Direct, Bending and torsional stress equations calculation of principle stresses Electric motor classification, Motor selection: Speed-Torque curves, Speed control of electrical motors, Design of Flat belts and pulleys - Selection of V belts and pulleys – Design of Transmission chains and Sprockets. Selection of pulleys and sprockets for the above transmission systems.

UNIT II SHAFTS, COUPLINGS AND CYLINDERS 9
Design of solid and hollow shafts based on strength, rigidity and critical speed – Keys, key ways and splines – crankshafts - Rigid and flexible couplings. Static and Dynamic balancing- Rotating and Reciprocating masses, Balancing machine; Cylinders–Thin and thick cylinders.
UNIT III   GEARS
Law of Gearing, Tooth Profile, Speed ratios and number of teeth-Force analysis -Tooth stresses - Dynamic effects – Fatigue strength - Factor of safety - Gear materials – Design of straight tooth spur & helical gears – Pressure angle in the normal and transverseplane- Equivalent number of teeth-forces for helical gears.

UNIT IV   GEAR BOXES

UNIT V   CAMS CLutches AND BRAKES
Cam Design: Types, Timing Diagram-Follower types-pressure angle and under cutting base circle determination-forces and surface stresses. Design of plate clutches –axial clutches-cone clutches-internal expanding rim clutches-shoe and band brakes - external shoe brakes – Internal expanding shoe brake -Electromagnetic clutches.

TOTAL : 45 PERIODS

Note: (Use of P S G Design Data Book is permitted in the University examination)

OUTCOME:
• Upon completion of this course, the student can successfully design machine elements and transmission components used in printing machinery.

TEXT BOOK:

REFERENCES:
OBJECTIVE:
- To provide an overview of the printing machinery maintenance and maintenance management.

UNIT I  MAINTENANCE MANAGEMENT PERSPECTIVE  9

UNIT II  TOTAL PLANNED MAINTENANCE  9
System components, documentation, facility register, records, safety related issues. Spare parts management. Maintenance schedules and control system. Inspection and lubrication, purpose, lubricants, lubricating systems.

UNIT III  TOTAL PRODUCTIVE MAINTENANCE  9

UNIT IV  ERECTION AND TESTING  9
Foundation requirements, Condition based maintenance: Condition monitoring, Techniques, Vibration analysis, Thermography, Non destructive testing methods and diagnostic instruments.

UNIT V  RECONDITIONING AND REPLACEMENT THEORY  9
Repairs and reconditioning methods for various parts, roller copperising, re-rubberizing. Replacement models - Replacement policy, replacement of items, Determination of average life.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Analyze the basic concepts of maintenance management
- Identify the stages of machine erection and testing
- Create a maintenance schedule based on criticality and economics
- Evaluate equipment effectiveness

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To impart knowledge about principles of quality
- To understand statistical process control tools and quality standards
- To implement quality control in various stages of printing

UNIT I  FUNDAMENTALS OF QUALITY
Fundamental concepts of Quality, Quality Cost, Specification of Quality, Quality inspection, Quality Challenges in printing; Types of Standards such as ISO/PSO, TAPPI, CGATS, CIE, ICC, Media Standard, DIN, ASTM, ANSI.

UNIT II  STATISTICAL PROCESS CONTROL
Introduction to Statistical Process Control, Statistical Quality Control; Types of Variation, Control charts for Variable and attribute data, Acceptance sampling for attributes, Acceptance sampling for variables, Operation Characteristics curve, Selection and collection of data, Interpretation of data and statistical inference, Data analysis using statistical softwares like Minitab, SPSS, SAS.

UNIT III  MATERIALS QUALITY CONTROL
Quality Control procedures and practices used in receiving and for inventory management in print house. Substrate testing – Rheology, particle size, press performance testing, dried print performance testing, surface energy of inks, Importance of proper handling and maintenance of records of performance of materials.

UNIT IV  PREPRESS QUALITY CONTROL
Need for establishing clearly meaningful job specifications and acceptable tolerance limits. Quality of originals, Input Resolution, File-formats, Linearization, Calibration and Profile creation, Image editing, anti aliasing, trapping, image mixing, Pre-flight Check, Proofing, RIP, Simulation of Proof-to-Press, Output/Imaging.

UNIT V  PRESS QUALITY CONTROL
Process variability and measures of variability, Process inspection and control procedures for every production department, developing of quality monitoring checklists for all processes, checklists of definable and measurable attributes of products, waste and spoilage reduction, Press Characterization (finger printing) and standardization, Various test forms used for standardization.

OUTCOMES:
Upon completion of the course, the student will be able to:
- Implement ISO standards
- Evaluate quality of incoming materials and outgoing products
- Identify instruments required for implementing quality
- Analyze the statistical data and establish process and wastage control

TEXT BOOKS:
2. Miles Southworth & Donna Southworth, Quality and Productivity in the Graphic Arts, Graphic Arts Publishing Company, 1990

REFERENCES:
OBJECTIVES:
- To understand the various features, materials and methods involved in Security Printing.
- To know the appropriate Printing Techniques for different security applications.

UNIT I  INTRODUCTION

UNIT II  INKS
Types of security printing inks-Invisible ink, thermochromic ink, solvent sensitive ink, optically variable ink, magnetic ink, biometric ink, fugitive ink, secondary fluorescing ink, indelible inks, Invisible Phosphorescent inks, Water Resistant Inks.

UNIT III  SECURITY SUBSTRATES
Security Fibres, , Fluorescent Hilites, Iridescent coating, Security threads, Holographic foil, Colour centered paper, Chemical reactive, chemically void, toner fused paper, visible security fibers, invisible fluorescent fibers and other security papers.

UNIT IV  SECURITY PRINTING TECHNOLOGY

UNIT V  APPLICATIONS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Analyze the security features in printed products
- Develop security techniques as per the requirement
- Incorporate standards and specifications in security printing

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

PT7017 SPECIALITY PRINTING

OBJECTIVES:
- To understand the advanced reproduction techniques in printing.
- To appreciate the impact of printing in product security.
- To learn the selection of print production technique suitable for substrate, shape and securing operations.

UNIT I INTRODUCTION
Different types of specialty printing, Functions, Anti-counterfeiting features, Currency printing, Intaglio printing, Postage Stamp printing, Map printing, MICR, Hologram, Semiconductor lithography, Advance printing techniques.

UNIT II SPECIALITY DESIGN
Graphic Design - concept, graphic, logo, page, product, brand, label and advanced concepts; Digital printing techniques; prototypes

UNIT III SPECIALITY PRINTING
Concepts, techniques and applications - Pad printing, textile printing, tissue paper printing; printed electronics - solar cell, talking book, visiting cards; POD, direct mailers, thermography, lenticular printing, Braille printing; security printing- overt and covert printing, Water transfer printing, 3D printing, Decals

UNIT IV VALUE ADDITION PROCESSES
UV coating- matt, gloss, cold, textured, metallic coating, applications; varnishes- types, selection, blind emboss, de-bossing; laminations -types, materials , techniques; Foiling - Hot, cold;

UNIT V SPECIALITY FINISHING OPERATIONS
Menu card printing and folding, value added features - phaidon mailer, z-bind, greeting card with special fold, reception cards- valley and mountain fold, duplexing, perforation, brochures; Diecut-Hugo Boss, etched and laser, kiss cut cards – security features. Premium packages

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Design innovative print products using specialty printing techniques.
- Enhance value addition to existing print design
- Analyze new avenues for speciality operations

TEXT BOOKS:
REFERENCES:

PT7018 VISUAL COMMUNICATION L T P C
3 0 0 3

OBJECTIVES:
- To understand the Importance of Visual Communication and its application.
- To analyze the various vehicles of Visual communication

UNIT I INTRODUCTION
Visual arts history from cave drawings to video painting, identifying and analyzing hidden languages in various media and cultures.

UNIT II PRINCIPLES OF VISUAL COMMUNICATION

UNIT III VISUAL ANALYSIS
Visual persuasion and propaganda, visual image analysis, stereotypes and the media, Ethics of visual story telling.

UNIT IV PRINCIPLES OF DESIGN
Balance, Emphasis, Simplicity, Repetition, Rhythm, Proportion, Unity, Variety, The application of design principles in creating visual images, Case studies.

UNIT V APPLICATION OF VISUAL COMMUNICATION
Overview of print, Photography, Video and audio media, Study of techniques and methods of applying visual communication in newspapers, magazines, video, internet, advertising and public relations. Analysis of visual event–film, TV, photo exhibit, advertisements, etc. Case studies.

OUTCOMES:
Upon completion of the course, the student will be able to:
- Apply the principles of visual communication to various media.
- Design using the various visual communication theories.
- Develop Visual Communications in day to day usage.

TEXT BOOKS:
REFERENCES:

GE7072 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

OBJECTIVES:
- To understand the global trends and development methodologies of various types of products and services
- To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them into design specification
- To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT

UNIT II REQUIREMENTS AND SYSTEM DESIGN

UNIT III DESIGN AND TESTING
UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT

UNIT V BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Gain knowledge of the Innovation & Product Development process in the Business Context
- Work independently as well as in teams
- Manage a project from start to finish

TEXTBOOKS:
1. Book specially prepared by NASSCOM as per the MoU.

REFERENCES: