



**ANNA UNIVERSITY CHENNAI  
CHENNAI - 600 025**

**UNIVERSITY DEPARTMENTS**

**REGULATIONS 2012**

**CURRICULA AND SYLLABI FOR  
I TO VIII SEMESTERS**

**B.E. PRINTING TECHNOLOGY  
(FULL TIME)**



**ANNA UNIVERSITY :: CHENNAI 600 025**

**UNIVERSITY DEPARTMENT**

**R-2012**

**B.E. PRINTING TECHNOLOGY**

**I TO VIII SEMESTERS CURRICULA AND SYLLABI**

**SEMESTER I**

<b>SL. NO.</b>	<b>CODE NO.</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	HS8151	Technical English I	3	1	0	4
2	MA8151	Mathematics I	3	1	0	4
3	PH8151	Engineering Physics	3	0	0	3
4	CY8151	Engineering Chemistry	3	0	0	3
5	GE8151	Computing Techniques	3	0	0	3
6	GE8152	Engineering Graphics	2	0	3	4
<b>PRACTICAL</b>						
7	PH8161	Physics Laboratory	0	0	2	1
8	CY8161	Chemistry Laboratory	0	0	2	1
9	GE8161	Computer Practices Laboratory	0	0	3	2
10	GE8162	Engineering Practices Laboratory	0	0	3	2
<b>TOTAL</b>			<b>17</b>	<b>2</b>	<b>13</b>	<b>27</b>

**SEMESTER II**

<b>SL. NO.</b>	<b>CODE NO.</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	HS8251	Technical English - II	3	1	0	4
2	MA8251	Mathematics - II	3	1	0	4
3	PH8205	Physics for Printing Technology	3	0	0	3

4	CY8203	Chemistry for Printing Technology	3	0	0	3
5	GE8251	Engineering Mechanics	3	1	0	4
6	PT8201	Principles of Printing Engineering and Technology	3	0	0	3
<b>PRACTICAL</b>						
7	CY8213	Chemistry Lab for Printing Technology	0	0	4	2
8	PT8211	Printing Design Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>7</b>	<b>25</b>

### SEMESTER III

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1	MA8357	Transform Techniques and Partial Differential Equations	3	1	0	4
2	CE8353	Strength of Materials	3	0	0	3
3	EC8352	Electronics Engineering	3	0	0	3
4	EE8251	Basic Electrical Engineering and Measurements	3	0	0	3
5	PT8301	Imaging Technology	3	0	0	3
<b>PRACTICAL</b>						
6	CE8362	Strength of Materials Laboratory	0	0	3	2
7	EC8361	Electronics Engineering Laboratory	0	0	3	2
8	EE8262	Electrical Engineering Laboratory	0	0	3	2
9	PT8311	Imaging Technology Laboratory	0	0	3	2
<b>TOTAL</b>			<b>15</b>	<b>1</b>	<b>12</b>	<b>24</b>

**SEMESTER IV**

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1	MA8352	Applied Statistics	3	1	0	4
2	GE8351	Environmental Science and Engineering	3	0	0	3
3	ME8452	Mechanics of Machines	3	0	0	3
4	PT8401	Colour Reproduction	3	0	0	3
5	PT8402	Digital Data Handling	3	0	0	3
6	PT8403	Paper and Board	3	0	0	3
<b>PRACTICAL</b>						
7	PT8411	Image Design & Editing Laboratory	0	0	3	2
8	PT8412	Offset Platemaking Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>1</b>	<b>6</b>	<b>23</b>

**SEMESTER V**

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1	PT8501	Microprocessor and Microcontroller	3	0	0	3
2	PT8502	Packaging Materials	3	0	0	3
3	PT8503	Printing Inks and Coatings	3	0	0	3
4	PT8504	Sheetfed Offset Technology	3	0	0	3
5	E1	Elective - I	3	0	0	3
6	E2	Elective -II	3	0	0	3
<b>PRACTICAL</b>						
7	PT8511	Colour Reproduction Laboratory	0	0	3	2

8	PT8512	Microprocessor and Microcontroller Laboratory	0	0	3	2
9	PT8513	Printing Machine Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>0</b>	<b>9</b>	<b>24</b>

### SEMESTER VI

SL. NO	CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1	PT8601	Electronic Publishing	3	0	0	3
2	PT8602	Print Finishing	3	0	0	3
3	PT8603	Print Operations Management	3	0	0	3
4	PT8604	Web Offset Technology	3	0	0	3
5	E3	Elective –III	3	0	0	3
6	E4	Elective –IV	3	0	0	3
<b>PRACTICAL</b>						
7	HS8561	Employability Skills	0	0	2	1
8	PT8611	Crossmedia Publishing Laboratory	0	0	3	2
9	PT8612	Print Finishing Laboratory	0	0	3	2
10	PT8613	Print Production Laboratory	0	0	4	2
<b>TOTAL</b>			<b>18</b>	<b>0</b>	<b>12</b>	<b>25</b>

### SEMESTER VII

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1	PT8701	Flexographic Printing	3	0	0	3
2	PT8702	Gravure and Screen Printing	3	0	0	3
3	PT8703	Packaging Technology	3	0	0	3

4	E5	Elective – V	3	0	0	3
5	E6	Elective – VI	3	0	0	3
6	E7	Elective – VII	3	0	0	3
<b>PRACTICAL</b>						
7	PT8711	Industrial Training	0	0	*	2
8	PT8712	Package Design and Testing Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>0</b>	<b>3</b>	<b>22</b>

\* 4 Weeks of Industrial Training; 2 weeks each during the 2<sup>nd</sup> & 3<sup>rd</sup> year summer vacations

### SEMESTER VIII

#### THEORY

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
1	E8	Elective – VIII	3	0	0	3
2	E9	Elective - IX	3	0	0	3
<b>PRACTICAL</b>						
3	PT8811	Project Work	0	0	12	6
<b>TOTAL</b>			<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

**TOTAL = 27+ 25+23+24+24+25+22+12**

**TOTAL CREDITS: 182**

#### ELECTIVES

SL. NO.	CODE NO	COURSE TITLE	L	T	P	C
1	PT8001	Advertising Techniques	3	0	0	3
2	PT8002	Book Publishing	3	0	0	3
3	PT8003	Colour Management	3	0	0	3

4	PT8004	Digital Pre-press and Printing	3	0	0	3
5	PT8005	Electronic Communication	3	0	0	3
6	PT8006	Financial Management for Printing	3	0	0	3
7	PT8007	Industrial Quality Control and Reliability Engineering	3	0	0	3
8	PT8008	Mass Communication	3	0	0	3
9	PT8009	Newspaper and Periodical Publishing	3	0	0	3
10	PT8010	Printing Machinery Maintenance	3	0	0	3
11	PT8011	Quality Control in Printing	3	0	0	3
12	PT8012	Security Printing	3	0	0	3
13	PT8013	Visual Communication	3	0	0	3
14	MA8353	Numerical Methods	3	1	0	4
15	MA8356	Probability and Statistics	3	1	0	4
16	GE8751	Engineering Ethics And Human Values	3	0	0	3
17	MG8654	Total Quality Management	3	0	0	3
18	IE8071	Human Resource Management	3	0	0	3
19	ME8075	Energy Conservation In Industries	3	0	0	3
20	ME8076	Entrepreneurship Development	3	0	0	3
21	ME8081	Reliability Concepts in Engineering	3	0	0	3
22	MF8076	Nanotechnology	3	0	0	3
23	MF8079	Total Productive Maintenance	3	0	0	3



**OBJECTIVES**

- To enable all students of engineering and technology develop their basic communication skills in English.
- To give special emphasis to the development of speaking skills amongst the students of engineering and technology.
- To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading for pleasure.

**UNIT I**

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); Speaking - Speaking about one's place, important festivals etc. – Introducing oneself, one's family / friend; Reading - Skimming a reading passage – Scanning for specific information - Note-making; Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one's leisure time activities, hometown, etc.); Grammar - Prepositions - Reference words - Wh-questions - Tenses (Simple); Vocabulary - Word formation - Word expansion (root words / etymology); E-materials - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

**UNIT II**

Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; Reading – Critical reading - Finding key information in a given text - Sifting facts from opinions; Writing - Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; Grammar - Use of imperatives - Subject-verb agreement; Vocabulary - Compound words - Word Association; E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

**UNIT III**

Listening - Listening to specific task - focused audio tracks; Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause

& effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; Grammar - Tenses (Past) - Use of sequence words - Adjectives; Vocabulary - Different forms and uses of words, Cause and effect words; E-materials - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

#### **UNIT IV**

Listening - Watching videos / documentaries and responding to questions based on them; Speaking - Responding to questions - Different forms of interviews - Speaking at different types of interviews; Reading - Making inference from the reading passage - Predicting the content of a reading passage; Writing - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays; Grammar - Adverbs – Tenses – future time reference; Vocabulary - Single word substitutes - Use of abbreviations & acronyms; E-materials - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

#### **UNIT V**

Listening - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV; Speaking - Giving impromptu talks, Making presentations on given topics; Reading - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email Writing - Creative writing, Poster making; Grammar - Direct and indirect speech; Vocabulary - Lexical items (fixed / semi fixed expressions); E-materials - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

#### **TEXT BOOKS**

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012 .
2. S.P. Dhanavel, English and Communication skills for students of science and Engineering. Orient Black Swan, Chennai,2011

#### **REFERENCE BOOKS:**

1. Pickett, Nell Ann, Ann A.Laster and Katherine E.Staples. Technical English: Writing, Reading and Speaking. New York: Longman, 2001.
2. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge, 2011.
3. Morgan, David and Nicholas Regan. Take-Off: Technical English for Engineering. Reading: Garnet Publishing Limited, 2008.

4. Thorn, Michael and Alan Badrick. An Introduction to Technical English. Harlow: Prentice Hall Europe, 1993.
5. Rizvi, M.Ashraf. Effective Technical Communication. New Delhi: Tata McGraw-Hill Publishing Company, 2007.

#### **EXTENSIVE READERS:**

1. Murthy, Sudha. Wise & Otherwise. New Delhi: Penguin Books India, 2006.
2. Gates, Bill and Collins Hemingway. Business @ the Speed of Thought: Succeeding in the Digital Economy. New York: Warner Business Books, 2000.

#### **WEBSITE RESOURCES**

1. [www.uefap.com](http://www.uefap.com)
2. [www.eslcafe.com](http://www.eslcafe.com)
3. [www.listen-to-english.com](http://www.listen-to-english.com)
4. [www.owl.english.purdue.edu](http://www.owl.english.purdue.edu)
5. [www.chompchomp.com](http://www.chompchomp.com)

**MA8151**

**MATHEMATICS – I**

**L T P C**

**(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 3 1 0 4**

#### **OBJECTIVES:**

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

#### **UNIT I MATRICES**

**9+3**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

**UNIT II INFINITE SERIES****9+3**

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D’Alembert’s ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

**UNIT III FUNCTIONS OF SEVERAL VARIABLES****9+3**

Limits and Continuity – Partial derivatives – Homogeneous functions and Euler’s theorem – Total derivative – Differentiation of implicit functions – Change of variables –Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

**UNIT IV IMPROPER INTEGRALS****9+3**

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions.

**UNIT V MULTIPLE INTEGRALS****9+3**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

**TOTAL : 60 PERIODS****TEXT BOOKS:**

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.

**REFERENCES:**

1. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 3rd Edition, 2007.
2. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
3. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.

4. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.

**PH8151**

**ENGINEERING PHYSICS**  
**(Common to ALL Branches of B.E./B.Tech. Programmes)**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

**UNIT I PROPERTIES OF MATTER**

**9**

Elasticity - Poisson's ratio and relationship between moduli (qualitative) - Stress-strain diagram - factors affecting elasticity - bending of beams - cantilever - bending moment - theory and experiment of Young's modulus determination - Uniform and non-uniform bending - I shaped girders - twisting couple - hollow cylinder - shaft - torsion pendulum - determination of rigidity modulus- moment of inertia of a body (regular and irregular).

**UNIT II ACOUSTICS AND ULTRASONICS**

**9**

Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - rate of growth and decay of sound intensity - derivation of Sabine's formula - absorption coefficient and its determination - factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance - noise and their remedies. Ultrasonics - production - magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating - industrial applications - NDT - Ultrasonic method: scan modes and practice.

**UNIT III THERMAL PHYSICS**

**9**

Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity - conductions in solids - Forbe's and Lees' disc methods - Rectilinear flow of heat through a rod - flow of heat through a compound materials - radical flow of heat through a spherical shell - thermal insulation of buildings – Laws of blackbody radiation: Kirchoffs law, Stephens law, Wiens law, Raleigh-Jean law and Planks law (derivation). Laws of thermodynamics - Otto and diesel engines and their efficiency - entropy - entropy of Carnot's cycle - reverse Carnot's cycle - refrigerator.

**UNIT IV APPLIED OPTICS**

**9**

Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its application - Lasers - Einstein's

coefficients - CO<sub>2</sub>, Nd:YAG and semiconductor lasers - homo junction and hetero junction - construction and working - applications - Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

## **UNIT V SOLID STATE PHYSICS**

**9**

Nature of bonding - growth of single crystals (qualitative) - crystal systems - crystal planes and directions - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults - unit cell, Bravais space lattices - miller indices.

**TOTAL : 45 PERIODS**

### **TEXT BOOKS:**

1. Gaur R.K., and Gupta, S.L., Engineering Physics, Dhanpat Raj Publications, 2003.
2. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Ltd, 2006.
3. Arumugam, M., Engineering Physics, Anuradha Publications, 2000.

### **REFERENCES:**

1. Sankar, B.N., Pillai.S.O., Engineering Physics, New Age International (P) Ltd., 2007.
2. Rajendran.V Engineering Physics, Tata McGraw-Hill, 2009.

**CY8151**

**ENGINEERING CHEMISTRY**

**L T P C**

**(Common to all branches of Engineering and Technology)**

**3 0 0 3**

## **UNIT I CHEMICAL THERMODYNAMICS**

**9**

Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. 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 II POLYMER CHEMISTRY**

**9**

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerisation. Types and mechanism of

polymerisation: Addition (Free Radical, cationic, anionic and living); condensation and copolymerisation. Properties of polymers: T<sub>g</sub>, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerisation: Bulk, emulsion, solution and suspension.

### **UNIT III KINETICS AND CATALYSIS**

**9**

Introduction – reaction velocity, factors affecting reaction velocity, rate constant, order of reaction, molecularity, pseudo molecular reactions, zero, first, second and third order reactions, reactions of fractional orders, determination of order of reactions. Catalysis: Auto catalysis - Enzyme Catalysis: Michaelis-Menton equation; factors affecting enzyme catalysis. Heterogeneous Catalysis: Types of adsorption isotherms: Langmuir–Hinselwood and Rideal–Eley Mechanism.

### **UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY**

**9**

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Photoprocesses - Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitisation. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. Width and intensities of spectral lines. Spectrophotometric estimation of iron. UV-visible and IR spectroscopy – principles, instrumentation (Block diagram) and applications.

### **UNIT V NANOCHEMISTRY**

**9**

Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: Nanocluster, nanorod, nanotube and nanowire. Synthesis: Precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and Applications. Risk discussion and Future perspectives.

**TOTAL : 45 PERIODS**

#### **TEXT BOOKS:**

1. P. Kannan and A. Ravikrishnan, “Engineering Chemistry”, Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2009.
2. S. Vairam, P. Kalyani and Suba Ramesh, “Engineering Chemistry”, Wiley India, 2011

#### **REFERENCE BOOKS:**

1. P.W. Atkins and de Paula Julio, “Physical Chemistry”, Oxford University Press, 8th Ed., (Indian Student Edition) (2009).

2. K. K. Rohatgi-Mukherjee, "Fundamental of Photochemistry" New Age International (P) Ltd., New Delhi, 1986.
3. G.A. Ozin and A.C. Arsenault, "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.
4. .V.R.Gowariker, N.V.Viswanathan and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.), Chennai, 2006

**GE8151**

**COMPUTING TECHNIQUES**

**L T P C**

**3 0 0 3**

**UNIT I INTRODUCTION**

**8**

Generation and Classification of Computers- Basic Organization of a Computer –Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.

**UNIT II C PROGRAMMING BASICS**

**10**

Problem formulation – Problem Solving - Introduction to ' C' programming –fundamentals – structure of a 'C' program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

**UNIT III ARRAYS AND STRINGS**

**9**

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String-String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

**UNIT IV FUNCTIONS AND POINTERS**

**9**

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems.

**UNIT V STRUCTURES AND UNIONS**

**9**

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

**TOTAL : 45 PERIODS**



## TEXTBOOKS

1. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.

## REFERENCES

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Byron S Gottfried, " Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007

**GE8152**

**ENGINEERING GRAPHICS**

**L T P C**

**2 0 3 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 HAND SKETCHING**

**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 normal to the above curves, Scales: Construction of Diagonal and Vernier scales.

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 one of the principal planes by rotating object method and auxiliary plane method.

**UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 14**

Sectioning of above 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.

**TOTAL: 75 PERIODS**

**TEXT BOOK:**

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010

**REFERENCES:**

1. K.R.Gopalakrishna., “Engineering Drawing” (Vol I&II combined) Subhas Stores, Bangalore, 2007

2. Luzzader, Warren.J., and Duff,John M.,,” Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005
3. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson, 2nd Edition, 2009
4. K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited ,2008.
5. K. V.Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
6. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi,2008.

**PUBLICATION OF BUREAU OF INDIAN STANDARDS:**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation –Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

**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

**PH8161**

**PHYSICS LABORATORY**

**L T P C**

**(common to all branches of B.E./B.Tech. Programmes)**

**0 0 2 1**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Torsional pendulum</li> <li>2. Non – uniform bending</li> <li>3. Lee’s disc</li> <li>4. Potentiometer</li> <li>5. Air wedge</li> </ol> | <ul style="list-style-type: none"> <li>– Determination of rigidity modulus of wire and moment of inertia of disc</li> <li>– Determination of young’s modulus</li> <li>– Determination of thermal conductivity of a bad conductor</li> <li>– Determination of thermo e.m.f. of thermocouple</li> <li>– Determination of thickness of a thin sheet of paper</li> </ul> |
|--|--|

- |     |                      |   |
|-----|----------------------|---|
| 6.  | i. Optical fibre     | – Determination of Numerical Aperture and acceptance angle                    |
|     | ii. Compact disc     | – Determination of width of the groove using laser                            |
| 7.  | Acoustic grating     | – Determination of velocity of ultrasonic waves in liquids                    |
| 8.  | Post office box      | – Determination of Band gap of a semiconductor                                |
| 9.  | Spectrometer         | – Determination of wavelength using grating                                   |
| 10. | Viscosity of liquids | – Determination of co-efficient of viscosity of a liquid by Poiseuille's flow |

**TOTAL : 30 PERIODS**

**CY8161**

**CHEMISTRY LABORATORY**

**L T P C**

**(Common to all branches of Engineering and Technology)**

**0 0 2 1**

1. Estimation of HCl using  $\text{Na}_2\text{CO}_3$  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.
11. Determination of molecular weight of poly vinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics – ester hydrolysis.
13. Corrosion experiment – weight loss method.
14. Determination of CMC.
15. Phase change in a solid.

**TOTAL: 30 PERIODS**

## REFERENCE BOOKS

1. A text of quantitative inorganic analysis, A. L. Vogel , ELBS London. 1995.
2. Experiments in physical chemistry, D.P. Shoemaker and C.W. Gardad, McGraw Hill, London, 2001.
3. American Public Health Association.

**GE8161**

**COMPUTER PRACTICES LABORATORY**

**L T P C**  
**0 0 3 2**

### 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 and conversion from given program to flow chart.
10. Program using structures and unions.

**TOTAL: 45 PERIODS**

**GE8162**

**ENGINEERING PRACTICES LABORATORY**  
**(COMMON TO ALL BRANCHES OF B.E./B.TECH. PROGRAMMES)**

**L T P C**  
**0 0 3 2**

### OBJECTIVE

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 PRACTICE**

**12**

#### **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 – inlet.

Laying pipe connection to the delivery side of a pump – out let.

Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

#### **WOOD WORK**

Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

Study

Study of joints in door panels, wooden furniture

Study of common industrial trusses using models.

### **2. ELECTRICAL ENGINEERING PRACTICE**

**9**

Basic household wiring using switches, fuse, indicator – lamp etc.,

Preparation of wiring diagrams

Stair case light wiring

Tube – light wiring

Study of iron-box, fan with regulator, emergency lamp

## **GROUP – B**

## **(MECHANICAL AND ELECTRONICS)**

**15**

### **3. MECHANICAL ENGINEERING PRACTICE**

#### **WELDING**

Arc welding of butt joints, lap joints, tee joints

Gas welding Practice.

Basic Machining

Simple turning, drilling and tapping operations.

Machine assembly Practice.

Study and assembling the following:

Centrifugal pump, mixies and air conditioners.

Demonstration on

- (a) Smithy operations like the production of hexagonal bolt.
- (b) Foundry operation like mould preparation for grooved pulley.

#### **4. ELECTRONIC ENGINEERING PRACTICE**

**9**

Soldering simple electronic circuits and checking continuity.

Assembling electronic components on a small PCB and testing.

Study of Telephone, FM radio, low-voltage power supplies.

**TOTAL: 45 PERIODS**

**HS8251**

**TECHNICAL ENGLISH II  
(FOR ALL BRANCHES OF B.E / B.TECH PROGRAMMES)**

**L T P C**

**3 1 0 4**

#### **OBJECTIVES**

- To make the students acquire listening and speaking skills meant for both formal and informal contexts
- To help them develop their reading skills by exposing them to different types of reading strategies
- To equip them with writing skills needed for academic as well as workplace situations
- To make them acquire language skills at their own pace by using e-materials and language lab component

#### **UNIT I**

Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using 'emoticons' as symbols in email messages; Grammar - Regular & irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. 'can') - Homophones (e.g. 'some', 'sum'); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

## **UNIT II**

Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his success, thanking one's friend / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercise on Grammar and vocabulary, Extensive reading activity (reading stories / novels from links), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students' dialogues.

## **UNIT III**

Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret etc.); Reading - Speed reading – reading passages with the time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. 'rock', 'train', 'ring'); E-materials - Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU materials – Attending a meeting and writing minutes.

## **UNIT IV**

Listening - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices; Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences; E-materials - Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.



## **UNIT V**

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/ agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials - Intensive reading Writing - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises - Pictures for discussion; Language Lab - Different models of group discussion

**TOTAL: 60 PERIODS**

### **TEXT BOOKS:**

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012 .
2. S.P.Dhanavel, English and Communication skills for students of science and Engineering. Orient Black Swan, Chennai,2011

### **REFERENCE BOOKS:**

1. Laws, Anne. Presentations. Hyderabad: Orient BlackSwan, 2000.
2. Lewis, Hedwig. Body Language: A Guide for Professionals. New Delhi: Sage Publications, 1998.
3. Naterop, Jean B. and Rod Revell. Telephoning in English. Cambridge: Cambridge University Press, 1987.
4. Rutherford, Andrea J. Basic Communication Skills for Technology. New Delhi: Pearson Education, 2001.
5. Ur, Penny. Teaching Listening Comprehension. Cambridge: Cambridge University Press, 1984.

### **EXTENSIVE READERS:**

1. Abdul Kalam, A P J. Ignited Minds: Unleashing the Power within India. New Delhi: Penguin Books India, 2002.
2. Parameswaran, Uma. C.V.Raman: A Biography. New Delhi: Penguin Books India, 2011.

### **WEB RESOURCES:**

1. [www.esl-lab.com](http://www.esl-lab.com)
2. [www.englishgrammar.org](http://www.englishgrammar.org)

3. [www.englishclub.com](http://www.englishclub.com)
4. [www.mindtools.com](http://www.mindtools.com)
5. [www.esl.about.com](http://www.esl.about.com)

**MA8251**

**MATHEMATICS II**

**L T P C**

**(common to all branches of B.E. / B.Tech. Programmes in II Semester) 3 1 0 4**

**OBJECTIVES:**

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- 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 the of 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 DIFFERENTIAL EQUATIONS**

**9+3**

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.

**UNIT II VECTOR CALCULUS**

**9+3**

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

**UNIT III ANALYTIC FUNCTION**

**9+3**

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

**UNIT IV COMPLEX INTEGRATION**

**9+3**

Line integral - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s series – Singularities – Residues – Residue theorem – Application of residue theorem for

evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

## **UNIT V LAPLACE TRANSFORMS**

**9+3**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem — Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

**TOTAL : 60 PERIODS**

### **TEXT BOOKS:**

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana, B.V. “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2010.

### **REFERENCES:**

1. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education, New Delhi, 2007.
2. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, Delhi, 3rd Edition, 2007.
3. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
4. Peter V.O’Neil, Advanced Engineering Mathematics, Cengage Learning India Pvt., Ltd, New Delhi, 2007.

**PH8205**

**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  $\eta$  Basic visco-elasticity - effect of temperature - measurement - visco-elastic 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** **9**

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** **9**

Analog and digital modulation - electro optic modulators - magneto optic devices - optical switching and logic devices. Photoluminescence, cathode luminescence, electroluminescence, injection luminescence - plasma displays - organic LEDs - liquid crystals and LCD construction and working - photo detectors - junction photodiode - barcode generation - barcode reader.

**UNIT V      OPTICAL IMAGE PROCESSING** **9**

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**

**REFERENCES :**

1. D.S. Mathur, Properties of Matter, S. Chand & Co. Ltd., 2007
2. Gaur R.K., and Gupta, S.L. Engineering Physics, Dhanpat Raj Publ., 2003.
3. D. Halliday R. Resnick J. Walker Fundamentals of Physics (Sixth Edition), John Wiley & Sons (ASIA) Pte. Ltd., Singapore, 2004.
4. Bhattacharya, B., Semiconductor optoelectronic devices, Prentice Hall of India, 1995.
5. Goodman, J.W., Introduction to Fourier optics, Viva Books Pvt. Ltd., 2007.

**AIM**

To impart knowledge on the Applied Chemistry topics important in Printing Engineering.

**OBJECTIVES**

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****9**

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****9**

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****9**

Polymers – Classification; Commodity – Polyethylene, Polypropylene, Polyvinyl chloride, Polystyrene; Engineering – Polyamide, Polyethylene Terephthalate, Polycarbonate, Acrylonitrile Butadiene styrene, Specialty – polyether ether ketone, Polyether sulfone, polyphenylene oxide – Preparation, Properties, uses. Foams – Polystyrene, Polyurethane, Polyolefins – Characterization, Development, Processing, Applications. Composites - Introduction- definition - constitution- classification- applications of composite materials- fiber reinforced composites- properties of reinforced composites.

## **UNIT IV ALLOYS AND PHYSICAL METALLURGY**

**9**

Alloys: Introduction- Definition- Properties of Alloys- Significance of alloying, Functions and effect of alloying elements- Ferrous alloys: iron – carbon phase diagram – heat treatment of steel - significance of the phases and microstructures in imparting characteristic properties to steels, alloy steels; Non-ferrous alloys: Importance – brass, bronze, aluminium alloys, solders, nickel alloys.

Physical metallurgy- powder metallurgy- preparation of metal powders (mechanical pulverization, atomization, chemical reduction, electrolytic process and decomposition)- mixed and blending – compacting- sintering- uses, advantages and limitations of powder metallurgy.

## **UNIT V INSTRUMENTAL METHODS AND ANALYSIS**

**9**

Principle - instrumentation- block diagram-data analysis and applications of: X-Ray diffraction analysis, Microscopic analyses: Scanning Electron Microscopy, Tunneling Electron Microscopy, Scanning Tunneling Microscopy and Atomic Force Microscopy. Thermal methods: Differential Scanning Calorimetry, Thermo-gravimetric analysis, Differential thermal analysis. Chromatography – column chromatography, HPLC.

**TOTAL : 45 PERIODS**

### **TEXT BOOKS:**

1. Jain P.C. and Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010.
2. Dara.S.S., A Textbook of Engineering Chemistry, S.Chand & Company Ltd., New Delhi, 2010
3. B.Sivasankar., Engineering Chemistry, TATA McGraw Hill, 2008

### **REFERENCE BOOKS:**

1. Kenneth G. Budinski, Michael K. Budinski., Eastern Economy Edition., Ninth Edition., 2010.
2. P.Kannan, A.Ravikrishnan., Srikrishna Hitech Publishing Company.,2009.
3. Gauri Shankar Misra.,Introductory polymer chemistry., New Age International, 2010

**OBJECTIVE**

To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

**UNIT I BASICS AND STATICS OF PARTICLES****9 + 3**

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces — Vectorial representation of forces – Vector operations of forces -additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

**UNIT II EQUILIBRIUM OF RIGID BODIES****9 + 3**

Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

**UNIT III PROPERTIES OF SURFACES AND SOLIDS****9 + 3**

Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

**UNIT IV DYNAMICS OF PARTICLES****9 + 3**

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion -Newton's laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.

**UNIT V      FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS****9 + 3**

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

**TOTAL: 60 PERIODS (L:45 + T:15)****TEXT BOOKS:**

1. Beer, F.P and Johnson Jr. E.R. “Vector Mechanics for Engineers (In SI Units): Statics and Dynamics”, 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004)
2. Vela Murali, “Engineering Mechanics”, Oxford University Press (2010)

**REFERENCES:**

1. Hibbeler, R.C and Ashok Gupta, “Engineering Mechanics: Statics and Dynamics”, 11th Edition, Pearson Education (2010).
2. Irving H. Shames and Krishna Mohana Rao. G., “Engineering Mechanics – Statics and Dynamics”, 4th Edition, Pearson Education (2006)
3. J.L.Meriam and L.G.Kraige, “ Engineering Mechanics- Statics - Volume 1, Dynamics-Volume 2,Third Edition, John Wiley & Sons,(1993)
4. Rajasekaran, S and Sankarasubramanian, G., “Engineering Mechanics Statics and Dynamics”, 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005).

**PT8201      PRINCIPLES OF PRINTING ENGINEERING AND TECHNOLOGY****L T P C****3 0 0 3****OBJECTIVE**

To impart knowledge on various printing processes, designing, layout and planning for print production. This introductory course will provide an overview to printing.

**UNIT I      PRINCIPLES OF ENGINEERING****9**

Engineers as Problem Solvers - Past, Present and Future; Engineering Team; Careers in Engineering; Engineering, Technology, Distinction between Engineering and Technology, Sketching, Technical Writing

Technical Reports, Data Representation and Presentation, Presentations; Design Process - Problem Identification, Design Brief, Problem Analysis, Information Gathering, Alternative Solutions and Optimization, Modeling, Testing and Evaluation, Presentation of Solution.



**UNIT II PRINCIPLES OF DESIGN 9**

Basic concepts of designing, Creativity, steps in creativity; Typography; Visual ingredients of graphic design; Design consideration; Symbols and logos. Layout – purpose & advantages; layout styles; layout components; stages in preparing a layout; marking-up; Dummy, Case studies.

**UNIT III DESIGNING FOR MEDIA 9**

Designing for Newspapers, Booklets, Magazines, Business publications, Banners & Posters, Advertising, Transit, Interactive, Web and Maps. Case studies.

**UNIT IV INTRODUCTION TO PRINTING PROCESSES 9**

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 9**

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.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. David A. Lauer, Stephen Pentak, “Design Basics”, 6th Edition, Wadsworth, 2005
2. Poppy Evans and Mark A. Thomas, ‘ Exploring the Elements of Design”, Delmar Publishers, 2004

**REFERENCE BOOKS:**

1. Albert C. Book, C. Dennis Schick, “Fundamentals of Copy and Layout”, Crain Books, 1984
2. Roger Walton, Keith Gillies, Lindsey Heppell, “Graphic Design”, Ebury Press, 1987
3. Pamela Mortimer, “Document Design Primer”, GATF, 2003
4. Helmutt Kipphan, “Handbook of Print Media”, Springer, Heidelberg, 2000
5. T. M. Adams, D.D. Faux and L. T. Ricber, “Printing Technology”, Delmar Publications Inc., 1996
6. Robin McAllister, “Design for Production”, Delmar Publishers, 1997.

**List of Experiments:**

1. Determination of Iodine value.
2. Determination of Acid value of resin.
3. Estimation of aniline point.
4. Determination of Cu in Brass sample.
5. Determination of Fe in Iron Ore.
6. Determination of Ca in Limestone.
7. Identification of functional groups in organic compounds.
8. Identification of monomers in polymers.
9. Determination of viscosity index by Brookfield viscometer.
10. Determination of TGA of polymeric sample.

**TOTAL: 60 PERIODS****REFERENCES:**

1. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New York (2001).
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., Vogel's Textbook of practical organic chemistry, LBS Singapore (1994).
3. G.H.Jeffery, J.Bassett, J.Mendham and R.C Denny vogel's, Text book of quantitative analysis chemical analysis, ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
4. I.M. Kolthoff, E.B.Sandell et.al. Quantitative chemical analysis, Mcmillan, Madras 1980.

**OBJECTIVE:****To acquire skills on,**

- Designing using paint and brush
- Sketching using pencil
- Collage Art

## Basic Design

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

## Materials Required:

- Set of HB & B black lead pencils
- Set of poster colours
- Set of Paint brushes

**TOTAL: 30 PERIODS**

<b>MA8357</b>	<b>TRANSFORM TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATION</b>	<b>L T P C</b>
		<b>3 1 0 4</b>

## 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.

<b>UNIT I</b>	<b>PARTIAL DIFFERENTIAL EQUATIONS</b>	<b>9+3</b>
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Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange's Linear equation – Integral surface passing through a given curve – Classification of Partial Differential Equations - Solution of linear equations of higher order with constant coefficients – Linear non-homogeneous PDE.

**UNIT II      FOURIER SERIES****9+3**

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 9+3**

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****9+3**

Fourier integral theorem – Fourier transform pair-Sine and Cosine transforms – Properties – Transform of elementary functions – Convolution theorem – Parseval's identity.

**UNIT V      Z – TRANSFORM AND DIFFERENCE EQUATIONS****9+3**

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and Final value theorems – Formation of difference equation – Solution of difference equation using Z-transform.

**TOTAL : 60 PERIODS****TEXT BOOK:**

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2007.

**REFERENCES:**

1. Glyn James, "Advanced Modern Engineering Mathematics", Pearson Education, New Delhi, 2007.
2. Ramana, B.V. "Higher Engineering Mathematics", Tata McGraw Hill, New Delhi, 11th Reprint, 2010.
3. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
4. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.

**OBJECTIVE:**

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

**UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9**

Rigid bodies and deformable solids – Tension, Compression and Shear Stresses – Deformation of simple and compound bars – Thermal stresses – Elastic constants – Volumetric strains – Stresses on inclined planes – principal stresses and principal planes – Mohr's circle of stress.

**UNIT- II TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM 9**

Beams – types transverse loading on beams – Shear force and bending moment in beams – Cantilevers – Simply supported beams and over – hanging beams. Theory of simple bending – bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stress distribution.

**UNIT- III TORSION 9**

Torsion formulation stresses and deformation in circular and hollow 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 – Lamé's theory – Application of theories of failure.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Bansal, R.K., Strength of Materials, Laxmi Publications (P) Ltd., 2007
2. Jindal U.C., Strength of Materials, Asian Books Pvt. Ltd., New Delhi, 2007

## REFERENCES:

1. Egor. P.Popov “ Engineering Mechanics of Solids” Prentice Hall of India, New Delhi, 2001
2. Subramanian R., Strength of Materials, oxford University Press, Oxford Higher Education Series, 2007.
3. Hibbeler, R.C., Mechanics of Materials, Pearson Education, Low Price Edition, 2007
4. Ferdinand P. Been, Russell Johnson, J.r. and John J. Dewole Mechanics of Materials, Tata Mcgraw Hill publishing ‘co. Ltd., New Delhi.

**EC8352**

**ELECTRONICS ENGINEERING**

**L T P C**  
**3 0 0 3**

### **UNIT I SEMICONDUCTORS AND RECTIFIERS 9**

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 9**

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 9**

FET – Configuration and characteristics, FET amplifier, Characteristics and simple applications of SCR, Diac, Triac and UJT.

### **UNIT IV SIGNAL GENERATORS AND LINEAR ICs 9**

Positive feedback, Sinusoidal oscillators – RC phase shift, Hartley, Colpitts, Wein bridge oscillators, Operational amplifier – Adder, Inverting and Non-inverting amplifiers, integrator and differentiator, IC 555 based Astable and Monostable Multivibrators.

### **UNIT V DIGITAL ELECTRONICS 9**

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.

**TOTAL:45 PERIODS**

**TEXT BOOK:**

1. Malvino, 'Electronic Principles', McGraw Book Co., 1993.

**REFERENCES:**

1. Grob. B and Schultz. M.E. 'Basic Electronics', Tata Mcgraw Hill, 2003.
2. Thomas L. Floyd, 'Electronics Devices', Pearson Education, 2002.
3. Thomas L. Floyd, 'Digital Fundamentals', Pearson Education, 2003.
4. Millman, Halkias Jacob, Jit Christos and Satyabrata, 'Electronic devices and Circuits', Tata McGraw Hill, 2nd Edition.

**EE8251      BASIC ELECTRICAL ENGINEERING AND MEASUREMENTS      L T P C**  
**3 0 0 3**

**AIM**

To provide knowledge in the basic concepts of Electric Circuits, Electrical machines and Measurement techniques.

**OBJECTIVE**

To impart knowledge on

- Electric circuit laws
- Principle of Electrical Machines
- Various measuring instruments

**UNIT I      ELECTRICAL CIRCUITS      9**

Ohms Law – Kirchhoff's Law-Steady state solution of DC circuits – introduction to AC circuits – waveforms and RMS value – Power and power factor- Three phase balanced and unbalanced circuits-Three phase Power measurement.

**UNIT II      ELECTRICAL MACHINES      9**

Construction and Principle of operation DC machines- Characteristics of DC machines 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 – Induction type, dynamometer type wattmeters – Energy meter – Megger – Instrument transformers (CT & PT)

–Wheatstone’s bridge for measurement of unknown resistance ,Maxwell’s bridge for unknown inductance and Schering Bridge for unknown capacitance

#### **UNIT IV    TRANSDUCERS**

**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.

**TOTAL: 45 PERIODS**

#### **TEXT BOOKS**

1. Del Toro ‘Electrical Engineering Fundamentals’ Pearson Education, New Delhi, 2007.
2. V.K Mehta and Rohit Mehta ‘ Principle of Electrical Engineering’ S Chand & Company,2008
3. Alan S. Moris, Principles of Measurements and Instruments, Printice-Hall of India Pvt. Ltd., New Delhi, 1999.
4. Smarjit Ghosh ‘Fundamentals of Electrical and Electronics Engineering, Second Edition 2007

#### **REFERENCES**

1. Rajendra Prasad ‘Fundamentals of Electrical engineering’ Prentice Hall of India, 2006.
2. Thereja .B.L ‘Fundamentals of Electrical Engineering and Electronics’ S chand & Co Ltd, 2008.
3. Sanjeev Sharma ‘basics of Electrical Engineering’ S.K International Publishers, New Delhi 2007.
4. John Bird, Electrical Circuits theory and Technology, Elsevier, First India Edition, 2006.
5. Doebeling, E.O., Measurements Systems – Application and Design’, McGrawHill Publishing Co, 1990.



**OBJECTIVE:**

To impart knowledge on laser typesetters, film processing, scanners, imagesetters, also give elaborate study of typographic parameters.

**UNIT I INTRODUCTION TO TEXT COMPOSING 9**

Printer's measurement system. Type series, Family, Typographic Parameters. Copy mark-up, Casting off, Copy editing. Proof reading marks. House style, Text composing techniques: Electrical & electronic typewriters, Word Processors. Founts – outline, truetype, opentype, Postscript; Early phototypesetters.

**UNIT II LASER TYPESETTERS 9**

Laser source: Helium Neon, Argon ion, Violet Laser diodes, Choice and Selection of laser, Principles of typesetters and printers, Modulation. Direct laser modulation, Acousto-optic modulation. Deflection methods – Mechanical deflectors. Holographic deflectors, Solid state deflectors, Polygon Scanning, Facet tracing optics and Scan-end detection mechanism. Speed and resolution of laser typesetters.

**UNIT III IMAGE ACQUISITION AND FILM PROCESSING 9**

Originals for reproduction, Scanner types – Drum, flatbed, Dynamic range, Resolution, Storage, File formats, Line reproduction, Halftone reproduction, Theories of dot formation. Action of light, Types of films – Development theory, variant in development, sensitometry, Transmission densitometer. Lens and lens aberrations. Screening technologies, Raster image processors, imagesetters.

**UNIT IV PLANNING & LAYOUT 8**

Lithographic production – Introduction; planning layout – Information, type of work, Preparing the layout; Imposition schemes; Book work – Margin calculations, Methods, positive and negative assembly; Planning softwares

**UNIT V PLATE CHEMISTRY & PROCESSING 9**

Base materials & properties – Aluminium, Stainless steel, Copper, Chromium, Nickel, Poly masters and paper masters; Graining – types; Contact angle and wettability; Anodisation – Process; Plate chemistry – dichromated colloids, diazo, and photopolymer compounds, Thermal sensitive, Silver halide, Silver hybrid plates; Plate exposing unit; Light source – Types

– advantages, disadvantages, Platesetters, 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.

**TOTAL:45 PERIODS**

**TEXTBOOKS:**

1. A.L.Gatehouse and K.N.Roper, “Modern Film Planning and Platemaking”, 3rd Edition, SITA Limited, 1990.
2. J. Michael Adams, David Faux and Loyds J. Reiber, “Printing Technology”, 3rd Edn. Delmar Pub, 1988.

**REFERENCES:**

1. Helmut Kipphan, “Handbook of Print Media”, 2001
2. “Handbook of Modern Halftone Photography”, Perfect Graphic arts, Demarset, U.S.A.
3. Phil Green, “Understanding digital colour”, Blueprint, 1995
4. David Bergsland, “Printing in a digital world”, Delmar Publishers 1997.
5. Frank Cost, “Pocket guide to digital Printing”, Delmar Publishers, 1997.
6. T.E. Schildgen, “Pocket guide to colour with digital application”, Delmar Publishers. 1998.

**CE8362**

**STRENGTH OF MATERIALS LABORATORY**

**L T P C**

**0 0 3 2**

**OBJECTIVES:**

To study the properties of materials when subjected to different types of loading.

**LIST OF EXPERIMENTS**

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

**TOTAL: 45 PERIODS**

**REFERENCE:**

1. Relevant Indian Standards

**EC8361****ELECTRONICS ENGINEERING LABORATORY****L T P C****0 0 3 2**

1. VI Characteristics of PN Junction and Zener Diodes.
2. Characteristics of CE configuration of Transistor.
3. Characteristics of UniJunction Transistor.
4. Characteristics of FET.
5. Operational Amplifier Applications – Adder, Multiplier.
6. RC Oscillator
7. LC Oscillators
8. IC 555 Astable and Monostable multivibrators
9. Half and Full adders
10. RS , T and D FFs
11. BCD counter using IC 7490

**TOTAL: 45 PERIODS****EE8262****ELECTRICAL ENGINEERING LABORATORY****L T P C****0 0 3 2**

1. Speed Control of DC Shunt Motor
2. Load Test on DC Shunt Motor
3. Study of starters
4. Swinburne's Test
5. Load Test on DC Series Motor
6. Load Test on three Phase Alternator
7. Load Test on three Phase Induction Motor
8. Wheatstone's Bridge
9. Load Test on single phase Induction Motor.
10. Load test on Single Phase Transformer.

**TOTAL: 45 PERIODS**

**OBJECTIVE:**

To give hands on training on typesetting parameters in page layout using page making software and familiarization of scanner and graphic software.

1. WORD PROCESSING SOFTWARE
  - a. Basic typesetting formats
2. PAGEMAKING SOFTWARE
  - a. Basic non-illustrated document preparation
  - b. Multiple Column Work
  - c. Tabular column & Table editing
  - d. Integration of text and Graphics
  - e. Tag/style formatting
  - f. Page Imposition
3. SCANNER
  - a. Introduction to scanner – scanning
4. GRAPHICS SOFTWARE
  - a. Free hand Drawing

**TOTAL: 45 PERIODS**

**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**

**9+3**

Sampling distributions - Tests for single mean, proportion and difference of means, proportions (large and small samples) - Tests for single variance and equality of variances- -test for goodness of fit- Independence of attributes.

**UNIT II NON-PARAMETRIC TESTS****9+3**

Advantages and drawbacks over parametric methods – Sign test - Median test – Mann-Whitney Wilcoxon U-test – Wald-Wolfowitz run test.

**UNIT III DESIGN OF EXPERIMENTS****9+3**

Completely randomized design - Randomized block design - Latin square design - 2<sup>2</sup> factorial design - Taguchi's robust parameter design.

**UNIT IV STATISTICAL QUALITY CONTROL****9+3**

Control charts for variables - Control charts for attributes - Tolerance limits - Acceptance sampling by attributes.

**UNIT V TIME SERIES****9+3**

Components of time series - Analysis of time series - Measurement of trend - Measurement of seasonal fluctuations.

**TOTAL: 60 PERIODS****TEXT BOOKS:**

1. Walpole R.E., Myers R.H., Myers S.L. and Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition 2007.
2. Gupta S.C. and Kapoor V.K., "Fundamentals of Applied Statistics", Sultan Chand and Sons, New Delhi, 2nd Edition, Reprint, 2002.

**REFERENCES:**

1. Johnson R.A., "Miller and Freund's Probability and Statistics for Engineers", PHI Learning Pvt. Ltd., New Delhi, 8th Edition, 2011.
2. Devore, J.L., "Probability and Statistics for Engineering and the Sciences", Thomson Brooks/Cole, International Student Edition, New Delhi, 7th Edition, 2008.
3. Milton, J. S. and Arnold, J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, New Delhi, 4th Edition, 3rd Reprint, 2008.

**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 organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

#### **UNIT V HUMAN POPULATION AND THE ENVIRONMENT**

**6**

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

**TOTAL : 45 PERIODS**

#### **TEXT BOOKS:**

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

#### **REFERENCE BOOKS:**

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

**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 toques acting on simple mechanical systems
- To understand the importance of balancing and vibration.

**UNIT I KINEMATIC OF MECHANICS 9**

Mechanisms – Terminology and definitions – kinematics inversions of 4 bar and slide crank chain – kinematics analysis in simple mechanisms – velocity and acceleration polygons – Analytical methods – computer approach – cams – classifications – displacement diagrams - layout of plate cam profiles – derivatives of followers motion – circular arc and tangent cams.

**UNIT- II GEARS AND GEAR TRAINS 9**

Spur gear – law of toothed gearing – involute gearing – Interchangeable gears – Gear tooth action interference and undercutting – nonstandard teeth – gear trains – parallel axis gears trains – epicyclic gear trains – automotive transmission gear trains.

**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 9**

Applied and Constrained Forces – Free body diagrams – static Equilibrium conditions – Two, Three and four members – Static Force analysis in simple machine members – Dynamic Force Analysis – Inertia Forces and Inertia Torque – D'Alembert's principle – superposition principle – dynamic Force Analysis in simple machine members.

**UNIT V BALANCING AND VIBRATION 9**

Static and Dynamic balancing – Balancing of revolving and reciprocating masses – Balancing machines – free vibrations – Equations of motion – natural Frequency – Damped Vibration – bending critical speed of simple shaft – Torsional vibration – Forced vibration – harmonic Forcing – Vibration isolation.

**TOTAL: 45 PERIODS**



**TEXT BOOK:**

1. Uicker J.J, Pennock G.R and Shigley J.E., "Theory of Machines and Mechanisms", 3rd Edition, Oxford University Press, 2009.

**REFERENCES:**

1. Rattan S.S., "Theory of Machines", 3rd Edition, Tata McGraw-Hill, 2009.
2. Bevan T., "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005.
3. Cleghorn W. L, "Mechanisms of Machines", Oxford University Press, 2005
4. Benson H.T., "Principles of Vibrations", Oxford University Press, 2nd Edition, 2007
5. Robert L.N, "Kinematics and Dynamics of Machinery", Tata McGraw-Hill, 2009.
6. Allen S.H Jr., "Kinematics and Linkage Design", Prentice Hall, 1961
7. Ghosh A. and Mallick A.K., "Theory of Mechanisms and Machines", Affiliated East-West Pvt. Ltd., New Delhi, 1988.
8. Rao J.S. and Dukupati R.V. "Mechanisms and Machine Theory", Wiley-Eastern Ltd., New Delhi, 1992.
9. Hannah J. and Stephens R.C., "Mechanics of Machines", Viva Low-Prices Student Edition, 1999.
10. Grover. G.T., "Mechanical Vibrations", Nem Chand and Bros., 1996
11. Thomson W.T., Dahleh M.D. and Padmanabhan C., "Theory of Vibration with Application", 5th edition Pearson Education, 2011
12. V.Ramamurthi, "Mechanics of Machines", Narosa Publishing House, 2002.
13. Khurmi. R.S., "Theory of Machines", 14th Edition, S Chand Publications.

**STANDARDS:**

IS 2458: 2001, Vocabulary of Gear Terms – Definitions related to Geometry.

IS 3756: 2002, Method of Gear Correction – Addendum modification for External cylindrical gears with parallel axes.

IS 5267: 2002 Vocabulary of Gear Terms – Definitions Related to Worm Gear Geometry.

IS 12328: Part 1: 1988 Bevel Gear Systems Part – 1 Straight Bevel Gears.

IS 12328: 1988 Bevel Systems Part – 2 Spiral Bevel Gears.

**PT8401****COLOUR REPRODUCTION****L T P C****3 0 0 3****OBJECTIVE:**

This course imparts the fundamental concepts of Colour Science & measurement and gives an overview of colour reproduction techniques. It gives an exposure to in-depth exploration of

issues involved in colour reproduction in print media and concepts behind image adjustment techniques. It also introduces the basic concepts of colour Management Systems.

#### **UNIT I COLOUR SCIENCE & MEASUREMENT 9**

Light, colour, Light sources, Sample, Observer, Colour vision, Colour matching experiment, Tristimulus values, Chromaticity diagram, Colour spaces – CIELAB, CIELUV, CIELCH, Munsell; Colour difference equations, Spectrophotometer, Viewing conditions and standards.

#### **UNIT II PRINCIPLES OF COLOUR REPRODUCTION 9**

Additive and Subtractive colour theory, Colour Fusion, Colour originals for reproduction. Reproduction objectives, Image Acquisition – scanners, digital cameras; Colour separation techniques, Screen angles and moire patterns.

#### **UNIT III SPECTRAL SENSITIVITIES, INK & PAPER 9**

Substrate – Whiteness, Brightness, Fluorescence, Gloss, Smoothness, Texture, Absorptivity; Ink – Pigment colour, transparency, opacity, masstone, undertone; Optics of ink film - first surface reflection, multiple internal reflections. Additivity and Proportionality rules; Light Source, colour filters, photographic emulsion.

#### **UNIT IV COLOUR CORRECTION & IMAGE ADJUSTMENTS 9**

Masking and its principles, Balanced inks, Tone reproduction-Jones Diagram; Gray balance, Masking equations, Neugebauer equation, Look Up Table, Image Adjustments - Colour correction, White point & Black point, Colour cast removal, USM, Black generation- UCR, GCR, UCA.

#### **UNIT V COLOUR MANAGEMENT 9**

Colour Management – Need, Open loop, Closed loop, Calibration, Characterization, Conversion, ICC, Profiles, Rendering intent, Gamut mapping. Device link and Dynamic device link profiles, Colour Servers, Digital proofing – Need & issues, Soft proofing, Remote proofing.

**TOTAL: 45 PERIODS**

#### **TEXT BOOKS:**

1. Gary Field, “Color and its Reproduction”, 3rd edition, GATF Press, 2004
2. Abhay Sharma, “Understanding Colour Management”, Thomson Delmar, 2004

#### **REFERENCE BOOKS:**

1. Phil Green, “Understanding Digital Color”, 2nd edition, GATF Press, 1999.

2. R. W. G. Hunt, "The Reproduction of Colour", 6th Edition, Wiley, 2004.
3. Berns R S, "Billmeyer & Saltzman 's Principle of Colour Technology", 3rd Edition, Wiley, 2000
4. J.Michael Adams David, Fauz, Llyod, J.Rieber, "Printing Technology", 3rd Edition, Delmar Publishers, 1988.
5. John A.C. Yule, "Principles of colour reproduction applied to photomechanical reproduction, Colour photography and ink, paper and other related industries", John Wiley & Sons, U.K., 2001

**PT8402**

**DIGITAL DATA HANDLING**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To provide exposure to the basic components of digital print production workflow like networking, file formats, Database management & security issues.

**UNIT I      WORKFLOW**

**9**

Workflow – editorial, pre-press, production; Automated workflow - components, File Preparation, Preflighting, Digital Imposition – preRIP, postRIP, OPI, Trapping, Postscript, PDF, CIP4 – JDF, JMF.

**UNIT II      NETWORKING**

**9**

Data transmission fundamentals, Communication media, Data interfaces, Concepts and principles of computer networks, PAN, LAN, WAN, MAN, 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**

**9**

File format – EPS, DCS, JPEG, GIF, TIFF, PNG, 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**

**9**

Database, Types, Database Management, Database Languages, Query processing, Data storage, Backup & recovery, Distributed databases, Data Warehousing, Data Mining, Security issues, Access Control, Digital Asset Management

**UNIT V SECURITY ASPECTS****9**

Security in Operating Systems, Principles of Network Security, Cryptography, Fire walls, Intrusion Detection Systems, Secure Email, Digital Rights Management

**TOTAL: 45 PERIODS****TEXT BOOKS :**

1. Abraham Silberschatz, Henry F. Korth, S.Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2002
2. Phil Green, "Understanding Digital Color", 2nd edition, GATF Press, 1999.

**REFERENCE BOOKS:**

1. Mani Subramanian, "Network Management: Principles & Practice", Addison Wesley, 1999
2. Sanjiv Purba, "Handbook of Data Management", Viva Books Private Ltd., 1999
3. Douglas E. Comer, "Computer Networks & Internets", 2nd Edition, Pearson Publications, 1999
4. Larry L. Pearson, Bruce S. Davie, "Computer Networks: A Systems Approach", Third Edition, Morgan Kauffman Publishers Inc., 2003
5. Abraham Silberschatz, Henry F. Korth, S.Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2002
6. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003
7. Helmut Kipphan, "Handbook of Print Media", Springer Verlag, 2001

**PT8403****PAPER AND BOARD****L T P C****3 0 0 3****OBJECTIVE:**

To impart knowledge on manufacturing processes, properties and testing of paper and board used for different printing processes and paper related problems in printing.

**UNIT I RAW MATERIALS & PROCESSING****9**

Sources, Kinds of cellulose fibres, De-barking, Pulping – Mechanical, Thermo-mechanical and Chemical processes – Bleaching techniques – Stock preparation – Beating & refining – Fillers, Sizing, Dyeing – Non-fibrous additives and consistency.

**UNIT II PAPER AND BOARD 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 PAPER AND BOARD COATING & CLASSIFICATION 9**

Paper and board coating – Pigments, binders and additives – Techniques; Main classes of paper and board; paper and board sizes; paper requirement for different printing processes; paper handling, de-Inking; recycling; end-use.

**UNIT IV PAPER AND BOARD PROPERTIES 12**

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, colour, opacity; Chemical – pH, ash content; Mechanical – Tensile, burst, tear, internal bonding, fold endurance, stiffness, pick resistance, absorbency.

**UNIT V PAPER PROBLEMS IN PRINTING 6**

Fluff, hickey, picking, piling, slurring and doubling, curl, chalking set-off, mottle, poor ink drying, show through, strike through mis-register, static electricity, blistering, web break.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Lawrence H.Wilson, "What the printer should know about paper", GATF Press, Third Edition, 2000.
2. Lothar Gottsching & Heikki Pakarinen, "Paper making Science and Technology", Book-7, Fapet OY Publishing, 2000.

**REFERENCE BOOKS:**

1. Bob Thompson, "Printing materials Science and Technology", Pira International Publications 2nd edition, 2004.
2. Herbert Holik, "Handbook of Paper and Board", Wiley – VCH, 2006.
3. Charles Finley, "Printing Paper and Ink", Delmar Publisher, 1997.
4. John Christopher Roberts, "Paper Chemistry", Springer – 1996
5. Christopher J. Biermann, "Handbook of Pulping and Papermaking", 1996.

**PT8411 IMAGE DESIGN AND EDITING LABORATORY L T P C  
0 0 3 2**

**Graphic Design Software**

1. Introduction to Tools
2. Creation of shapes & objects

3. Object Transformation
4. Layers
5. Text tool
6. Logo creation

**Image Editing and Colour Correction Software**

1. Introduction to tools
2. Layers
3. Retouching
4. Masking
5. Special effects

**TOTAL: 45 PERIODS**

**PT8412**

**OFFSET PLATEMAKING LABORATORY**

**L T P C  
0 0 3 2**

**OBJECTIVE:**

To provide hands on training to make imposition schemes and to expose plates using quality control aids.

1. Types of planning and layout preparation
2. Sheet work and Half sheet film assembly
3. Planning for irregular images
4. 32,64,and 128 pages book work
5. Materials Requirement Planning
6. Study of planning softwares.
7. Exposure optimization and standardization Printing Down Frame
8. Direct ruling / Wipe-on plate processing and standardization
9. Study of CTP machine and job planning
10. Exercise in workflow software.

**TOTAL : 45 PERIODS**

**OBJECTIVE:**

To impart knowledge on 8085 Microprocessor and 8051 Microcontroller and its applications. In addition the basic concepts and programming of 8085 Microprocessor and 8051 Microcontroller are introduced which are very much required in the emerging field of automation.

**UNIT I      8085 MICROPROCESSOR      9**

Introduction-Architecture of 8085-Pin Configuration-Addressing Modes-Instruction set.

**UNIT II      TIMING DIAGRAM AND PROGRAMMING      9**

Instruction cycle-machine cycle-T states and Timing diagram of 8085- Calculation of instruction cycle timings- Assembly Language Programming using 8085 instructions.

**UNIT III      PERIPHERALS AND INTERFACING      9**

Basic interfacing concepts-8255 Programmable Peripheral Interface- interfacing memory-Programmable Interval Timer 8253,USART-8251,key board/Display interface-8279

**UNIT IV      8051 MICROCONTROLLER      9**

Introduction- Architecture of 8051- Pin configuration- Ports- External Memory- counters and Timers- Serial and Parallel Data I/O- Interrupts – Assembly language programming

**UNIT V      APPLICATIONS using Intel 8085 and 8051      9**

A/D and D/A Converters Interfacing.Temperature Control- Stepper Motor Control- Traffic Light Controller. Measurement and speed control of DC motor.

**TOTAL :45 PERIODS**

**TEXT BOOKS:**

1. Ramesh Gaonkar, “Microprocessor Architecture, Programming and Applications with 8085”, Wiley Eastern, 1998.
2. Kenneth J.Ayala, “The 8051 Microcontroller, Architecture, Programming and applications”,Thomson Delmar Learning, Indian Edition, 2007.

## REFERENCES:

1. M.A. Mazidi and J.C. Mazidi, "The 8051 Microcontroller and Embedded systems", Pearson Education, 2006.
2. Douglas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", Tata McGraw Hill, 1999.
3. L.A. Levental, "Introduction to microprocessors Software and Hardware Programming", Prentice Hall Inc, 1978.
4. Aditya, P.Mathur, "Introduction to Microprocessors Software", Tata McGraw Hill, 1983
5. P.K.Ghosh and P.R.Sridhar, "Introduction to Microprocessors for Engineers and Scientists", Prentice Hall of India, 2001.

**PT8502**

**PACKAGING MATERIALS**

**L T P C**

**3 0 0 3**

## OBJECTIVE:

- To introduce the fundamental knowledge in the types of packaging materials
- To impart knowledge in the selection of suitable material for various packaging applications.

### **UNIT I PLASTICS**

**9**

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

### **UNIT II WOOD, PAPER AND TEXTILE**

**9**

Wood – Types, Materials, characteristic properties, application, Nature of wood, properties; 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**

**9**

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

### **UNIT IV ANCILLARY MATERIALS**

**9**

Label – types, materials, Label adhesives –Types, characteristic properties and uses; Collapsible tube – materials and properties. Closures and sealing – materials and properties;



Cushioning Materials – properties and areas of application. Lacquers – properties, uses; Special additives for food grade films; Nano materials, Reinforcement – materials and properties.

## **UNIT V MATERIAL TESTING**

**9**

Mechanical – Tensile, Tear burst, impact; barrier properties, WVTR 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.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Walter Soroka, Fundamentals of Packaging Technology, Institute of packaging professionals, Fourth Edition, 2009
2. S. Natarajan. M. Govindarajan, and B. Kumar “Fundamental of Packaging Technology” PHI, New Delhi, 2009

### **REFERENCE BOOKS:**

1. A.S.Athayle, “Handbook of Packaging Plastics”, Multi-tech Publishing Co., First Edition, 1999.
2. Aaron L.Brody & Kenneth S.Marsh, “Encyclopedia of Packaging Technology”, John Wiley Interscience Publication, II Edition, 1997.
3. Gunilla Johnson, “Corrugated Board Packaging”, PIRA International, 1993.
4. Arthur Hirsch, “Flexible Food Packaging”, Van Nostor and Reinhold, 1991.
5. A.S.Athayle, “Plastics in Flexible Packaging”, Multi-tech Publishing Co., First Edition, 1992.

**PT8503**

**PRINTING INKS AND COATINGS**

**L T P C**

**3 0 0 3**

### **OBJECTIVES:**

To study the raw materials, properties, manufacturing processes, testing, problems related to printing inks used for different printing processes and special inks.

**UNIT I      RAW MATERIALS      9**

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; Resins – Natural Rosin and its derivatives and Gumarabic; Synthetic – Rosin modified fumaric, maleic and phenolic, alkyds, hydro carbons, polyamides, Polyvinyl, Epoxy resins, Acrylic resins, Ethyl Cellulose and Nitro cellulose; Varnishes - types; Additives – Properties and applications – Driers, Waxes, Antioxidants, plasticizers, wetting agents, defoaming agents and Antiskinning agents.

**UNIT II      PRINTING INKS FOR DIFFERENT PROCESSES      9**

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; Manufacturing methods – Paste inks, Liquid inks, premixing, Flowchart - Ball mill, Bead mill and Triple roll mill.

**UNIT III      INK TEST AND MEASUREMENTS      9**

Viscosity, Tack, Colour, Gloss, Rub resistance, Length, Drying Characteristic, and Fineness of grind gauge, light fastness, Standards on environmental concerns, end use applications, Ink problems related to printing processes – Trouble shooting.

**UNIT IV      SPECIALITY INKS AND INK DRYING MECHANISMS      9**

Water based inks; Ink jet printing inks; Radiation curable inks - IR, UV & EB – Raw materials, equipment used for drying; Security inks – Thermo chromic and Photo chromic; Ink drying mechanisms.

**UNIT V      COATINGS      9**

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

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. R.H.Leach, "The Printing Ink Manual", 5th Edn., Chapman & Hall, London, 2002.
2. Philip Ruxton, "Printing Inks: Their Composition, Properties and Manufacture", General Books, 2010.

## REFERENCE BOOKS:

1. Cliffwoof, "A Manual for Flexographic Inks", Fishbum Printing Ink Co.Ltd., Watford.
2. Charles Finley, "Printing Paper and Ink", Delmar Publishers, 1997.
3. Nelson R.Eldred, "What the Printer should Know about inks", 3rd Edition GATF Press, 2001.
4. Bob Thompson, "Printing materials Science and Technology", 2nd edition, 2004.
5. Arthur A. Tracton," Coatings technology handbook", Taylor & Francis, 2005.
6. Ronald E.Tood, "Printing Inks – Formulation, Principles, Manufacture and Quality Control Testing", PIRA International 1996.

**PT8504**

**SHEETFED OFFSET TECHNOLOGY**

**L T P C**

**3 0 0 3**

## OBJECTIVE:

- To introduce the principles of offset
- To impart knowledge about the mechanisms of offset printing machines

### **UNIT I PRINCIPLES OF OFFSET**

**6**

Principles of lithography, wetting of a solid surface by a liquid before and after surface treatments. Emulsification of ink and fountain solution, fluid behaviour in a nip. Fundamental elements of offset printing machine.

### **UNIT II SHEET FEEDING AND CONTROL**

**10**

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**

**12**

Various types of configurations, cylinder design, requirements, plate and blanket clamping mechanisms. Gears, drives. Pressure setting, packing, print length variation, equal diameter, true rolling principles. Grippers, settings. Sheet transfer in multi colour presses, reversal systems for perfecting. Requirements of sheet delivery, quick delivery mechanisms. Anti set-off spray devices. Feeders, delivery and other system requirements for metal printing machines.

### **UNIT IV PRINTING BLANKETS, ROLLERS AND FOUNTAIN SOLUTION**

**10**

Blanket types, requirements, manufacture, performance attributes. Rollers, types, properties,

behavior. Basic inking and dampening system configuration. Fountain solution requirements, composition, re-circulation system and dosing units, Ink/water balance.

**UNIT V PRINTING AND INLINE OPERATIONS**

**7**

Make-ready operations, multi colour printing, automatic plate fixing, computer controls in printing, automatic blanket washing devices, roller washing solutions. Sheet coating systems, configuration spot coating and varnishing, numbering. Types of Dryers. Print problem identification and quality control.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. John MacPhee, "Fundamentals of Lithographic Printing: Vol.I - Mechanics of Printing", GATF, 1998.
2. A.S.Porter, "A Manual of Lithographic Press Operation", Lithographic Training Services.

**REFERENCE:**

1. W.R.Durrant. R.E. Witeworth and C.W.Meacock, "Machine Printing", Focal Press, London.

**PT8511**

**COLOR REPRODUCTION LABORATORY**

**L T P C**

**0 0 3 2**

**OBJECTIVES :**

- To do colour separation & colour correction using image editing softwares
- To implement colour management system.

1. Image acquisition from scanner and digital camera
2. File formats & Sampling
3. Tonal adjustment, Histogram analysis and equalization
4. Colour measurement and evaluation
5. Colour correction
6. Colour separation & proofing
7. Black Generation– UCR, GCR
8. Calibration and characterization of input & display device
9. Calibration and characterization of printer
10. Colour management in image editing softwares
11. Comparison of different quality standards

**TOTAL: 45 PERIODS**

**OBJECTIVE:**

To impart knowledge and hands on training in 8085 processor and 8051 microcontroller to perform functions such as arithmetic operation and interfacing.

1. Study of 8085 Microprocessor and 8051 Microcontroller trainer kits and identifying the components.
2. 8085 and 8051 Assembly language programs
  - i) Arithmetic operation ii) Ascending/descending order and finding largest/ smallest number in an array.
3. 8085 and 8051 Assembly Language Program for code conversion
  - i) BCD to binary ii) binary to BCD
4. 8051 Assembly Language Program for timer operations.
5. Interfacing of 8 bit A/D and D/A converters using 8085 and 8051
6. Stepper motor interface using 8085 and 8051
7. Display unit interface with 8085 and 8051

**TOTAL: 45 PERIODS****OBJECTIVE:**

To understand the controls, settings, mechanisms and have hands on training in Semiautomatic and Automatic printing machine.

1. Study of controls, operations and specifications of printing machines.
2. Feeder setting and Plate fixing
3. Single colour printing in semi automatic offset machine.
4. Study of various mechanisms and settings.
5. Single colour printing in automatic printing machine.
6. Roller and Cylinder pressure setting.

7. Study the effect of packing on print length.
8. Process colour printing in offset machine.
9. Densitometric measurements.

**TOTAL: 45 PERIODS**

**PT8601**

**ELECTRONIC PUBLISHING**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To impart knowledge on application of electronic publishing in various areas, basic workflow followed in electronic publishing, softwares & tools needed and the emerging trends.

**UNIT I INTRODUCTION**

**9**

Internet, WWW, Web2.0, Broadband, Print On-demand, e Book, eJournals, eNewspaper, internet advertising, Digital libraries, eReaders – e-Ink, e-paper, Electronic Publishing-Advantages, Issues.

**UNIT II PUBLISHING**

**9**

Areas of publishing – Legal, STM, Book Publishing – Manuscript, Anatomy of a book, Layout & Design, Journal Publishing – Layout & Design, Web Publishing – Layout & Design, Accessibility, usability, standards, Publishing on Handheld devices – Layout & Design , - Reference database – PUBMED etc. Index – author, volume, keyword.

**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**

**9**

Conventional workflow, XML workflow, STM Typesetting softwares, Pagination softwares, Image manipulation softwares, Markup languages – fundamentals, Presentation technologies (HTML, CSS, WML, XSL/XSL-FO), Representation technologies (XML, DTD, W3C XML Schema, ) Transformation technologies (SAX, DOM, XSLT), Scripting languages (ASP, JS, Perl), Unicodes for non-English characters.

**UNIT V EMERGING TRENDS****9**

Future publishing Models, Digital Asset Management, Digital Rights Management, Business models in Internet, Marketing, Recent trends

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Harold Henke, "Electronic Books and ePublishing: A Practical Guide for Authors", 1st edition, Springer, 2001.
2. William E Kasdorf, "The Columbia Guide to Digital Publishing", Columbia University Press, 2003

**REFERENCE BOOKS:**

1. Cady & McGregor, "Mastering the Internet" , 2nd edition, Business Promotion Bureau Publications, 1996
2. Deitel & Deitel, Neito, Sadhu, "XML How to Program", Pearson Education Publishers, 2001
3. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and Java", Prentice Hall of India – QUE, 1999
4. Scot Johnson, Keith Ballinger, Davis Chapman, "Using Active Server Pages", Prentice Hall of India, 1999.
5. Helmut Kipphan, "Handbook of Print Media", Springer Verlag, 2001

**PT8602****PRINT FINISHING****L T P C****3 0 0 3****OBJECTIVE:**

To impart knowledge on various finishing operations, materials & equipments used for print finishing

**UNIT I BINDING MATERIALS****7**

Overview of binding and finishing; Print finishing – classification; materials; JDF and MIS in bookbinding 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****10**

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****10**

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.

**UNIT IV GATHERING AND SECURING OPERATION****9**

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****9**

Edge treatment – characterization, edge staining, bookmark, rounding, backing, headband, edge treatment operation in production lines; case making – characterization, producing book covers, case making, casing in, inserting jackets; principles and operation of embossing, foil stamping-hot & cold, die-cutting, coating, indexing, round cornering, poly-bagging, preventing transit marking; lamination – types; In-Line Gluing Equipment, Off-Line Scoring, Shrink Wrapping, Automated Off-Line Kit Fulfillment, Integrated Off-Line Card and Label, Hybrid finishing formats and equipments, materials handling and mailing.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. T. J. Tedesco, "Binding, Finishing and Mailing: The Final World", GATF press, Pittsburgh, 1999.
2. G. Martin, "Finishing Process in Printing", Focal press Ltd., Britain, 1980

**REFERENCE BOOKS**

1. Ralph Lyman, "Binding and finishing", GATF, 1993
2. Arthur W. Johnson, "The practical guide to Craft Book Binding", Thames and Hudson, 1985



4. Arthur W. Johnson, "Book Binding", Thames and Hudson, 1984
5. T. M. Adams, D.D. Faux and L. T. Ricber, "Printing Technology", Delmar Publications Inc., 1996
6. Helmutt Kipphan, "Handbook of Print Media", Springer, Heidelberg, 2000

**PT8603**

**PRINT OPERATIONS MANAGEMENT**

**L T P C  
3 0 0 3**

**OBJECTIVE:**

After this course the student should:

- a. Understand the concepts of Scheduling and its importance in the printing Industry.
- b. Should have complete knowledge of the various applications of inventory and project management with respect to the Printing Industry.

**UNIT I INTRODUCTION**

**11**

Organization Structure – Sole Proprietor, Partnership, Limited Company, Administrative office routine, Forms used, Processing orders; Facility location decision making – Economic analysis – Qualitative factor Analysis – Layout of the factory – Analysis & selection; Human Factors - Consideration O' man & machine job-design, Ergonomics – Working Working environment – Worker safety.

**UNIT II SEQUENCING**

**11**

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**

**8**

Definition & purpose, Inventory classification, EOQ, Materials handling & Warehousing.

**UNIT IV MATERIALS & CAPACITY REQUIREMENT PLANNING**

**6**

MRP, CRP–Concepts & applications, Aggregate planning & Master Scheduling, ERP–Concepts and systems.

**UNIT V NETWORK MODELS**

**9**

Introduction, PERT & CPM models, Network construction, Problems, Resource analysis & allocation, Replacement analysis, Application & case studies.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. N.D.Vohra, "Quantitative techniques in management", Tata McGraw Hill Publishing Co.Ltd., 2003.
2. Joseph G.Monks, "Operations Management – Theory and Problems", Mc Graw Hill International Ltd., 2003.

**REFERENCE BOOK:**

1. U.K.Srivastava, G.V.Shenory & S.C.Sharma, "Quantitative techniques for Managerial decisions", New Age international (P) Ltd., Publishers – Formerly Wiley Eastern Ltd., 2001.

**PT8604****WEB OFFSET TECHNOLOGY****L T P C****3 0 0 3****OBJECTIVE:**

To understand the reel feeding mechanisms, web tension controls, dampening and inking systems, registering mechanisms and settings involved in a web offset printing machine.

**UNIT I PRESS CLASSIFICATION AND INFEED UNITS****12**

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****10**

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**

Inking system: requirements, design concepts, types of ink metering, roller train design, form rollers, heat generation, ghosting. Ink agitators, automatic ink pumping systems. Roller setting. Dampening system: requirements, types, metering methods, column control. Keyless inking,

Alcohol damping, spray, brush dampeners. Test forms. Print quality, measurement and control systems. Web offset printing problems, solutions and paper waste control.

**UNIT IV DRYING, CHILLING, FOLDING AND SHEETING UNITS 10**

Dryers: need, types, construction and working. Silicone coating, Chilling units, construction. Operational care and maintenance. Folders, types and delivery, Settings & Adjustments; Former and its adjustment, Balloon formers and insertions R.T.F., nip rollers, turner bars, bay windows, side and cut off margin controls. Kickers, markers, perforators, slitters, operation and maintenance. Sheeting device and mechanism, inline stitchers, Semi commercial – concepts, problems, challenges.

**UNIT V MAIL ROOM OPERATION 4**

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**

**TEXT BOOKS:**

1. W.R.Durrant, "Web Control: A Handbook for the Web Printer", 1997.
2. Edward J.Kelly, David B.Crouse and Robert R.Supansic, "Web Offset Press Operating", GATF Press, USA, 1982.

**REFERENCE BOOKS:**

1. David B.Crouse, "Web Offset Press Troubles", GATF Press, 1984.
2. John MacPhee, "Fundamentals of Lithographic Printing Vol.I Mechanics of Printing", GATF Press, 1998.
3. Helmutt Kipphan, "Handbook of Print Media", Springer, Heidelberg, 2000

(Common to all branches of Fifth or Sixth Semester B.E / B.Tech programmes)

**OBJECTIVES:**

- To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
  - To help them improve their soft skills, including report writing, necessary for the work-place situations
1. Making presentations – introducing oneself – introducing a topic – answering questions – individual presentation practice
  2. Creating effective PPTs – presenting the visuals effectively
  3. Using appropriate body language in professional contexts – gestures, facial expressions, etc.
  4. Preparing job applications - writing covering letter and résumé
  5. Applying for jobs online - email etiquette
  6. Participating in group discussions – understanding group dynamics - brainstorming the topic
  7. Training in soft skills - persuasive skills – People skills - questioning and clarifying skills – mock GD
  8. Writing Project proposals – collecting, analyzing and interpreting data / drafting the final report
  9. Attending job interviews – answering questions confidently
  10. Interview etiquette – dress code – body language – mock interview

**TOTAL: 30 PERIODS**

**REFERENCE BOOKS:**

1. Dhanavel, S.P. 2010. English and Soft Skills. Hyderabad: Orient BlackSwan Ltd.
2. Cornelissen, Joep. How to Prepare for Group Discussion and Interview. New Delhi: Tata-McGraw-Hill, 2009.
3. D'Abreo, Desmond A. Group Discussion and Team Building. Mumbai: Better Yourself Books, 2004.
4. Ramesh, Gopalswamy, and Mahadevan Ramesh. The ACE of Soft Skills. New Delhi: Pearson, 2010.
5. Gulati, Sarvesh. Corporate Soft Skills. New Delhi: Rupa and Co. 2006.

6. Van Emden, Joan, and Lucinda Becker. Presentation Skills for Students. New York: Palgrave Macmillan, 2004.

### **EXTENSIVE READERS**

1. Covey, Stephen R. The 7 Habits of Highly Effective People. New York: Free Press, 1989.
2. Bagchi, Subroto. The Professional. New Delhi: Penguin Books India, 2009.

### **WEB RESOURCES**

1. [www.humanresources.about.com](http://www.humanresources.about.com)
2. [www.careerride.com](http://www.careerride.com)

**PT8611**

**CROSSMEDIA PUBLISHING LAB**

**L T P C**  
**0 0 3 2**

1. HTML – Simple web page design
2. Scripting – Simple applet design
3. Introduction to XML and XSLT
4. Style sheet creation
5. Creating Data base & link
6. 2D animation
7. 3D animation
8. Audio & Video editing
9. Cross media designing
10. Tablet Publishing
11. Mini project

**TOTAL: 30 PERIODS**

**PT8612**

**PRINT FINISHING LABORATORY**

**L T P C**  
**0 0 3 2**

### **OBJECTIVE:**

To impart practical knowledge on

Various securing operations, case making and 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: 45 PERIODS**

**PT8613**

**PRINT PRODUCTION LABORATORY**

**L T P C**

**0 0 4 2**

### **OBJECTIVE:**

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

To produce various types of printed products like:

1. Office forms
2. Posters
1. Brochures
2. Book
3. Invitation/Greeting cards
4. Textile printing
5. Visiting Cards
6. Web publishing
7. Paperboard Package
8. POP displays

**OBJECTIVE:**

To introduce the basic principles of flexographic printing process, plate preparation & mounting methods, parts of a flexographic press and maintenance & quality control in flexo press.

**UNIT I INTRODUCTION 9**

Flexography – Basic principle, advantages, limitations, applications; Design considerations, screen angles, ink, substrates; Press types – stack, CI, inline, narrow web, wide web; Variations of press – coating, lamination, corrugated postprinting; environment & safety aspects

**UNIT II IMAGE CARRIER PREPARATION 9**

Moulded rubber plates; Photopolymer plates – Sheet photopolymer, liquid photopolymer, Direct Imaged Plates, Plate considerations – plate handling, storage, wrap distortion, Ink & solvent compatibility, quality.

**UNIT III MOUNTING AND PROOFING 9**

Plate mounting procedures, plate staggering, plate make ready; Manual Mounting, Video mounting, Sleeve mounting, Pin mounting, Proofing procedure.

**UNIT IV PRINTING PRESS 9**

Printing station – fountain rollers, anilox rollers, doctor blades, plate cylinders, impression rollers; Roll mechanics, unwind equipment, infeed, substrate treatment, web tension control, web guiding, inking systems, drying systems, cooling rolls, rewind equipment, web viewers, automatic viscosity controls

**UNIT V QUALITY CONTROL 9**

Pressroom Practices, Press Characterization, Flexo QC targets, press optimization Troubleshooting, Case studies.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. “Flexography : Principles & Practices”, 5th Edition, FTA, 2000.
2. “FIRST: Flexographic Image Reproduction Specifications & Tolerances”, 3rd Edition, FTA, 2003.

## REFERENCE BOOKS:

1. Frederick R.Boyle, "The Flexo Environment", Foundation of Flexographic Technical Association, 2002.
2. Anthony White, "High Quality Flexography", Pira reviews of Printing, Pira International, 1992.
3. Donna C.Mulvihill, "Flexography Primer", GATF Press, 1991.
4. Helmut Kiphhan, "Handbook of Print Media", Springer Verlag, 2001
5. J.Michael Adams David, Fauz, Llyod, J.Rieber, "Printing Technology", 3rd Edition, Delmar Publishers, 1988

**PT8702**

**GRAVURE AND SCREEN PRINTING**

**L T P C**

**3 0 0 3**

## OBJECTIVE:

To impart knowledge on

1. The basic principles of Gravure printing process, cylinder preparation techniques & components of gravure printing unit.
2. The basic principles of Screen printing process, stencil preparation methods & types of presses.
3. Print problems & quality control in Gravure & screen printing process

## **UNIT I GRAVURE PROCESS AND IMAGE CARRIER PREPARATION 12**

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 solvent less lamination; inline converting operations; power transmission system.

## **UNIT III SCREEN PRINTING COMPONENTS 7**

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 products.

**UNIT IV STENCIL PREPARATION AND PRESSES 9**

Stencil types – Direct stencil, indirect stencil, capillary film – stencil preparation; stencil selection; presses – graphic presses, textile presses, and container printing; dryers – types.

**UNIT V PRINT PROBLEMS AND QUALITY CONTROL 7**

Print problems and remedies; quality control aids; maintenance; health and safety issues; waste disposal and environmental safeguards.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. “Gravure: Process and Technology”, Gravure Education Foundation, 2003
2. Kaj Johansson, Peter Lundberg, Robert Ruberg, “A Guide to Graphic Print Production”, Wiley, 2002

**REFERENCE BOOKS:**

1. Harry B. Smith, “Modern Gravure Technology”, Pira reviews of Printing, Pira International, 1994
2. Samuel B. Hoff, “Screen Printing – A Contemporary Approach”, Delmar Publishers, 1997.
3. Ingram, Samuel, “Screen Printing Primer”, GATF press, 2nd Edition, 1999.
4. William Appleton, “Screen Printing”, PIRA International, 1994.
5. NIIR Board, “Screen Printing Technology Handbook”, Asia Pacific Business Press Inc., 2004

**PT8703**

**PACKAGING TECHNOLOGY**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To understand the purpose of packaging design

To study the different types of packaging process

To understand the packaging testing methods

## **UNIT I INTRODUCTION**

**6**

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

## **UNIT II PACKAGE DESIGN**

**8**

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 MANUFACTURING PROCESS**

**12**

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 IV SPECIALITY PACKAGING**

**12**

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

## **UNIT V PACKAGE TESTING**

**7**

Package Performance testing- test standards; drop test, inclined impact, Horizontal impact, vibration testing, stacking and compression test, corrugated board testing.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Walter Soroka, Fundamentals of Packaging Technology, Institute of packaging professionals, Fourth Edition, 2009
2. Bill Stewart, "Packaging Design Strategies", Pira International Ltd, 2nd Edition 2004.

## REFERENCES BOOKS:

1. Aaron L.Brody & Kenneth S.Marsh, "Encyclopedia of Packaging Technology", John Wiley Interscience Publication, II Edition, 1997.
2. Walter Stern, "Handbook of Package Design Research", Wiley Interscience, 1981.
3. Paine, "Packaging Development", PIRA International, 1990.
4. Arthur Hirsch, "Flexible Food Packaging", Van Nostor and Reinhold, New York, 1991.
5. E.P.Danger, "Selecting Colour for Packaging", Grover Technical Press, 1987.
6. Susan E.M.Selke & et al, Plastics Packaging, Hansar, 2nd edition 2004.
7. S. Natarajan. M. Govindarajan, and B. Kumar "Fundamental of Packaging Technology" PHI, New Delhi, 2009

**PT8711**

**INDUSTRIAL TRAINING**

**L T P C**

**0 0 3 2**

## OBJECTIVE:

- The main objective of the Industrial Training is 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 (During Sixth Semester holidays) in recognized 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.

**OBJECTIVE:**

Become acquainted with the nature and impact of visual communications in packaging design

To familiarize with the various graphic design and 3D Modeling software's

To conduct various characterization tests for packaging materials

**EXERCISES:**

1. Design of folding cartons
2. Design of flexible pouches
3. Graphic Designing for metal cans & glass containers
4. Determination of tensile strength of packaging materials
5. Determination of compression strength of packages
6. Determination of stiffness of packaging materials
7. Determination of burst strength of packaging materials
8. Determination of gloss and haze of packaging materials
9. Determination of rub resistance of packaging materials
10. Determination of gas permeability of packaging materials

**SOFTWARE REQUIREMENTS**

1. Graphic Design Software
2. Structural Package Design Software
3. Vector Image Drawing Software

**Equipments:**

1. Universal Testing Machine
2. Burst Tester
3. Stiffness Tester
4. Gas permeability tester
5. Rubresistance tester
6. Glossmeter
7. Hazemeter

**TOTAL: 45 PERIODS**

**PT8811**

**PROJECT WORK**

**L T P C**

**0 0 12 6**

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 examiners constituted by the Head of the Department based on oral presentation and the project report.

**PT8001**

**ADVERTISING TECHNIQUES**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To Enable the student to understand

- a. The concepts of Advertising.
- b. Role of the media
- c. Advertising Production and Business in detail

**UNIT I INTRODUCTION**

**9**

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**

**9**

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

**UNIT III      ADVERTISING MEDIA AND MEDIA PLANNING      9**

Media concept, structure of media, media characteristics, publication media, TV and Ratio, 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      9**

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      9**

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, planning and execution of campaign, evaluation of the campaign.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. David A.Aaker, Rajeev Batra, John G.Myers, “Advertising Management”, Prentice Hall Inc., 1999.
2. Maurice I.Mandell, “Advertising”, Prentice Hall Inc., 1999

**REFERENCE BOOKS:**

1. Leon G.Schiffman and Leslie Lajar Konar, “Consumer Behaviour”, Prentice Hall Inc., 1996.
2. Loudon, Della Bitta, “Consumer Behaviour concepts and Application”, McGraw Hill, 1996.
3. Wells, Burnett and Moriarty, “Advertising; Principles & Practice”, Prentice Hall Inc., 2002.

**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 7**

Areas of publishing – general publishing, educational publishing, professional publishing and reference publishing; Publishing house – the role of commissioning editor, the desk editor, the designer, the production manager, the sales/marketing manager, the publishing manager.

**UNIT II EDITORIAL PROCESS AND DEVELOPMENT 9**

Copy editing, Page makeup, Proofs; the book editor – multipurpose functions; Discussion with author, editing educational material, decision making role; editorial technique – style sheet, reference aids; the author and his manuscript – unsolicited manuscripts, author –publisher, professional guides and societies, the literary agency, author publisher relationship, writing textbooks for children

**UNIT III PRODUCTION & ESTIMATING IN BOOK PUBLISHING 10**

Pre-production planning, manuscript, layout & design, imposition, composition, anatomy of books; printing techniques; production process; technical aspects of production; Quality control – proofing stage; 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 10**

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      9**

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**

### **TEXT BOOKS:**

1. D. Raghavan, "An introduction to Book Publishing", Institute of Book Publishing, New Delhi, 1988
2. John P. Dessauer, "Book Publishing", R. R. Bowker Company, New York & London, 1981

### **REFERENCE BOOKS:**

1. Roy Paul Nelson, "Publication Design", Wm.C.Brown Company Publishers, Dubugue, Iowa, 1983
2. Charles Clark, "Publishing Agreement", Gearge Allen & Unwin, London, 1984
3. "British Production Practice", 2nd Edition, Publishers Association, British Printing Industries Federation, 1984
4. Hugh Williamson, "Methods of Book design", Yale University Press, 1983
5. John Peacock, "Book Production", Blueprint, 1995

**PT8003**

**COLOUR MANAGEMENT**

**L T P C**

**3 0 0 3**

### **OBJECTIVE:**

To give an insight into the advanced concepts of Colour management & an overview of various color management workflows.

## **UNIT I      COLOUR MANAGEMENT      9**

Need for colour management, device characteristics, closed and open loop colour control, Steps in CMS - calibration, characterization, conversion; International colour consortium – standards, profiles, profile types, profile structure, Color measurement, viewing conditions.



**UNIT II CREATION OF PROFILES 9**

Test targets, Devices, Calibration and characterization of scanner, digital camera, monitor, Press and Proofer; Issues, Profiling softwares

**UNIT III CONVERSION 9**

CMM, Gamut boundaries, Rendering Intent, Gamut mapping – influencing factors, algorithms

**UNIT IV WORKFLOW 9**

Colour Management workflows – RGB workflow, CMYK workflow, embedded workflow, assumed workflow, Internet workflow, Soft proofing, Hardcopy proofing, Colour management in software applications (Photoshop), Operating System

**UNIT V ADVANCES IN COLOUR MANAGEMENT 9**

Dynamic Device link profiles, Profile editing, profile quality, ECI, Colour appearance modeling, Case studies.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Abhay Sharma, “Understanding Colour Management”, Thomson Delmar, 2004.
2. Phil Green, Michael Kriss,”Color Management: Understanding and Using ICC profiles”, The Wiley-IS&T Series in Imaging Science and Technology, 2010

**REFERENCE BOOKS:**

1. Green P., “Understanding Digital Colour”, 2nd. Ed. GATF Press, 1999.
2. Berns R.S, “Billmeyer & Saltzman’s Principles of Colour Technology”, 3rd Ed. Wiley, 2000.’
3. Bruce Fraser, Chris Murphy, & Fred Bunting, “Real World Color Management”, 2nd Edition, Peachpit Press
4. Mark D.Fairchild, “Color Appearance Models”, Second Edition, John Wiley & Sons Ltd., 2005
5. Phil Green, Lindsay MacDonald, “Colour Engineering”, John Wiley & Sons Ltd., 2002
6. Adams R.M. & Weisberg J.B., “GATF Practical Guide to Colour Management”, 2nd. Ed. GATF Press, 2000.

**UNIT I IMAGE ACQUISITION 9**

Scanner types – Drum, flatbed. Dynamic range, Resolution, Storage, File formats. Digital Camera – Principles, mechanisms, types, resolution, memory.

**UNIT II DIGITAL WORKFLOW 9**

Receiving jobs, Pre-flighting, Scanning, File formats, JDF, XML, AdsML, PDF. Electronic trapping and imposition software.

**UNIT III DIGITAL PROOFING TECHNOLOGIES 9**

Digital proofing – Need, Proofing technologies – Ink jet, Dye sublimation, Thermal Wax, Electro photography. Inks, Dyes, Toners, Quality and relative merits.

**UNIT IV IMAGE SETTERS AND PLATE SETTERS 9**

Imagesetter – Types – Capstan, internal, external and virtual drum, light sources, raster image processors, screening technologies. Platesetters – Flat bed, internal, external drum geometries, chemical, thermal plates, light sources.

**UNIT V DIGITAL PRESSES 9**

Direct imaging printing systems- once imageable, re-imageable masters, Comparison, inline finishing, applications, trends

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Frank Cost, "Pocket guide to digital Printing", Delmar Publishers, 1997.
2. T.E. Schildgen, "Pocket guide to colour with digital application". Delmar Publishers, 1998.

**REFERENCE BOOKS:**

1. David Bergsland, "Printing in a digital world", Delmar Publishers, 1997.
2. Michael Limburg, "Gutenberg goes digital", Blue Print, 1955.
3. Anton & Peter Kammermeter, "Scanning & Printing, "Focal press, 1992.
4. Robin Mcallister, "Scanning & Image manipulation", Delmar Publishers, 1997.

5. Robin McAllister, "Colour", Delmar Publishers, 1997.
6. Phil Green, "Understanding digital colour", Blueprint, 1995.
7. Robin Mcallister, "Trapping", Delmar Publishers, 1997.
8. Helmut Kipphan (Ed.), "Handbook of Print Media", 2001.
9. Robert C.Durbeck Folsheer (Ed.), "Output Hardcopy Devices", Academic Press, Inc, 1988.

**PT8005**

**ELECTRONIC COMMUNICATION**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To impart knowledge of basic communication system, noise, modulation, wave propagation, digital communication and working of transmitters and receivers.

**UNIT I      AMPLITUDE MODULATION: TRANSMISSION AND RECEPTION 9**

Principles of amplitude modulation - AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, Low level AM modulator, medium power AM modulator, AM transmitters – Low level transmitters, high level transmitters, receiver parameters, AM reception – AM receivers – TRF, super heterodyne receiver, double conversion AM receivers.

External noise – Atmospheric noise – Extr terrestrial noise – industrial noise – Internal noise – Thermal agitation noise – Soft noise – Transit time noise- Miscellaneous noise – signal to noise ratio – Noise figure.

**UNIT II      ANALOG AND PULSE MODULATION      9**

Amplitude modulation – Modulation index – Frequency modulation – Phase modulation – DSB-SC, SSB, Vestigial side band. PAM, PWM, PPM, PCM.

**UNIT III      RADIATION AND PROPAGATION OF WAVES      9**

Fundamental of EM waves – Propagation – Ground waves – Sky wave propagation – Ionosphere – Space waves – Tropospheric scatter.

**UNIT IV      DIGITAL COMMUNICATION      9**

Emergence of data communication systems – Characteristics of data transmission circuits – Band with requirement – Data transmission rate – Noise – Cross talk – Echo suppressor

distortion- Equalizer – Digital codes. Voice and video digitization. Leased line – ISDN – Broadband.

**UNIT V COMMUNICATION SYSTEM**

**9**

Radio communication – AM and FM transmitter and receiver – Microwave communications – Satellite communication – Fibre optic communication (block diagram representation). TDM and FDM, Cellular communication.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Schoenbeck, “Electronics Communication – Modulation and Transmission”, 2nd Edition, Prentice Hall India, 1999.
2. George Kennedy, “ Electronics Communication Systems”, Tata McGraw Hill Publishing Co. Ltd., 1995.

**REFERENCES:**

1. Roddy and Coolem, “Electronics and Communication”, 4th Edition Prentice Hall, 1999.
2. Roy Blake, “Electronic communication systems”, Thomson – Delmar, 2005.
3. Luuis E. Frenzel Jr., “Principles of Electronic Communication System”, McGraw Hill, 2002.
4. William Schweber, “Electronic Communication System”, Prentice-Hall of India, 2005.
5. B.P. Lathi, “Modern Digital and Analog Communication System”, Oxford University press, 2003.

**PT8006**

**FINANCIAL MANAGEMENT FOR PRINTING**

**L T P C**

**3 0 0 3**

**OBJECTIVE:**

To impart knowledge on

1. Basic concepts of costing, pricing, estimating and investment analysis
2. Estimating cost of printing materials and different processes for various print jobs

**UNIT I COSTING AND PRICING**

**7**

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 7**

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 11**

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 11**

Classification of cost; elements of cost; costing of direct materials; costing of machine operations; costing of manual 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 – analysis, calculation of break even point, margin of safety, sensitivity analysis and profit graphs, Basics of Credit Management – AR, AP.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Hugh Speirs, "Print Estimator's Handbook", 2nd edition, Pira International Ltd., 2004
2. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw Hill, New Delhi, 6th Ed. 2004.

**REFERENCE BOOKS:**

1. "Cost Accounting for Printers", Part I and Part II, British Printing Industries
2. Federation, 1982
3. K. S. Venkataraman and K. S. Balaraman, "Estimating Methods and Cost Analysis for Printers", Ramya Features and Publications, 1987
4. Dipl.-Ing. B. D. Mendiratta, "Printer's Costing and Estimating", Printing India Publications Pvt. Ltd., 1999.
5. Hugh M. Speirs, "Print Estimators – The Handbook", BPIF, 1996.

6. N. D. Vohra, "Quantitative Techniques in Management", Tata McGraw Hill
7. Publishing Company Limited, 1990
8. James C. Van Hrone & John M. Wachowicz Ja, Fundamentals of Financial management, Prentice Hall India Pvt. Ltd., Eastern Economy Edition, New Delhi 2004, 11th Edition.

**PT8007**

**INDUSTRIAL QUALITY CONTROL AND RELIABILITY  
ENGINEERING**

**L T P C**

**3 0 0 3**

**OBJECTIVES:**

- Teach the essentiality of SQC, sampling and reliability engineering. Study on various types of control charts, six sigma and process capability to help the students understand various quality control techniques.
- Reliability engineering focuses on the dependability, failure mode analysis, reliability prediction and management of a system.

**UNIT I STATISTICAL QUALITY CONTROL 9**

Methods and Philosophy of Statistical Process Control - Control Charts for Variables and Attributes -Cumulative sum and Exponentially weighted moving average control charts - Other SPC Techniques – Process - Capability Analysis - Six sigma concept.

**UNIT II ACCEPTANCE SAMPLING 9**

Acceptance Sampling Problem - Single sampling plans for attributes – double sampling - multiple sampling - sequential sampling - Military standards - The Dodge Roming sampling plans – Random sampling.

**UNIT III RELIABILITY ENGINEERING 9**

Definition of reliability – Performance and reliability - Reliability requirements – System life cycle – Mean time between failures – Mean time to failure - Mortality Curve - Availability – Maintainability.

**UNIT IV FAILURE DATA ANALYSIS 9**

Statistical failures of components – failure distributions – Bath tub curve – Negative exponential distribution – Normal distribution - log normal distribution – Gamma distribution - Weibull distribution Life distribution measurements – Accelerated life tests - Data requirements for reliability.

## **UNIT V RELIABILITY PREDICTION AND MANAGEMENT**

**9**

Failure rate estimates - Effect of environment and stress - Series and Parallel systems - RDB analysis – Standby Systems - Complex Systems - Reliability demonstration testing - Reliability growth testing - Duane curve - Risk assessment – FMEA and Fault tree analysis.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Khanna O.P., “Statistical Quality Control”, Dhanpat Rai Publications (P) Ltd., 2001.
2. Lewis E.E., “Introduction to Reliability Engineering”, John Wiley and Sons, 1987.

### **REFERENCES:**

1. Zairi M., “Total Quality Management for Engineers”, Woodhead Publishing Limited 1991.
2. Noori H. and Russell, “Production and Operations Management - Total Quality and Responsiveness”, McGraw-Hill Inc, 1995.
3. Montgomery D.C., “Introduction to Statistical Quality Control”, 2nd Edition, John Wiley and Sons, 1991.
4. Klaassen H.B. and Peppen J.C.L., “System reliability concepts and applications”, Edward Arnold, 1989.

**PT8008**

**MASS COMMUNICATION**

**L T P C**

**3 0 0 3**

### **OBJECTIVE:**

To enable the student to understand

- The concepts of verbal and non-verbal communication
- The concepts of journalism

## **UNIT I INTRODUCTION**

**9**

Verbal and non-verbal communication, personal communication and mass communication, theories, principles and techniques of communication, history and role of mass media in society.

## **UNIT II NEWS REPORTING AND EDITING**

**9**

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 9**

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

**UNIT IV BROADCAST JOURNALISM 9**

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 9**

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**

**TEXT BOOKS**

1. Denis McQuail, "Mass Communication Theory; An Introduction to Theories of Mass Communication", 5th Edition, Melvin L. De Fleur, Sandra Bale-Rokeach, Sage Publications, 1999.
2. Stanley J. Baran, Dennis K. Davis, "Mass Communication Theory Foundations, Ferment and Future", 3rd Edition, Wadsworth Publishing, 2002.

**REFERENCE BOOKS**

1. Jennings Bryant, Dolf Zillmann, "Media Effects; Advances in Theory and search, 2nd Edition, Lea Publishers, 2002.
2. Melvin L. DeFleur, Sandra Bale-Rokeach, "Theories of Mass Communication", 5th Edition, Allyn and Bacon Publishers, 1999.
3. Arthur Asa Berger, "Essentials of Mass Communications Theory", SAGE Publications, 1995.



**OBJECTIVE:**

This course provides a detailed knowledge on the operations of newspaper and magazine companies, including their organizational structure, management functions, editorial process, production workflows and the legal issues.

**UNIT I NEWSPAPER ORGANISATION & MANAGEMENT 9**

Organizational structure & functions - Owner, editorial organization, management, Incoming materials, financial aspects, Production, advertising, distribution and promotion. The 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 11**

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 6**

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 11**

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 8**

The press and the law libel, defence against libel, mitigation & damages, Digital Rights Management, Watermarking, Readership strategies & trends, Distribution model for newspapers & magazines, Future developments

**TOTAL: 45 PERIODS**

## **TEXT BOOKS**

1. Daryl R. Moen, "Newspaper Layout & Design: A Team Approach ",Iowa State Press, 2000
2. Carter Nancy M. , "The Computerization of Newspaper Organizations", University Press of America , 2002

## **REFERENCE BOOKS**

1. Melvin Mencher, "Basic News Writing", Wm.C.Brown Company Publishers, Dubuque, Iowa, 1983.
2. William L.Rivers, "News Editing in the 80's", Wadsworth Publishing Company, Belmont, California, 1983.
3. Helmut Kipphan, "Handbook of Print Media", Springer Verlag, 2001
4. William L.Rivers, "Magazine Editing in the 80's", Wadsworth Publishing Company, Belmont, California, 1983.
5. Robert H.Bohle, "From News to Newsprint", Prentice Hall Inc., 1992
6. James E. Pollard, "Principles Of Newspaper Management", Mcgraw-Hill Book Company, Inc, 1937

**PT8010**

**PRINTING MACHINERY MAINTENANCE**

**L T P C  
3 0 0 3**

### **OBJECTIVE:**

To provide an overview of the printing machinery maintenance and maintenance management.

### **UNIT I MAINTENANCE MANAGEMENT PERSPECTIVE**

**9**

Objectives and functions, Problems and challenges, Organisation, Maintenance methods, Criticality determination, Categorization, Economic aspects of maintenance. Emerging trends.

### **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**

Six big losses, measuring the losses. Evaluating equipment effectiveness. Prepress maintenance, Press maintenance, Printing and allied equipment maintenance. Electrical

components maintenance: Motors, Electric brakes. Mechanical components maintenance: Bearings, Clutches, Drives.

**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**

**TEXT BOOK**

1. Venkataraman.K, "Maintenance Engineering and Management", Printice-Hall of India Private Limited., 2007.
2. P.Goplakrishnan, A.K.Banerji, "Maintenance and Spare Parts Management", Printice-Hall of India, 1977.

**REFERENCE BOOKS**

1. H.P.Garg, "Industrial Maintenance", S.Chand & Company Ltd., 1990.
2. Kenneth E.Rizzo, "Total Production Management", Second Edn., GATF Press.
3. N.D.Vohra, "Quantitative Techniques in Management", Tata McGraw – Hill Publishing Co. Ltd.
4. Herschell L. Apfelberg, "Maintaining Printing Equipment", GATF Press.
5. Lidley R.Higgins.P.E., L.C.Morrow, "Maintenance Engineering", Handbook, McGraw – Hill Publishing Co. Ltd.

**PT8011 QUALITY CONTROL IN PRINTING L T P C  
3 0 0 3**

OBJECTIVE: To impart knowledge about implementing quality control in printing

**UNIT I INTRODUCTION 8**

Definition of Quality, its purpose. Setting up a quality control programme and establishing necessary procedures, economic consideration. Management responsibility. Quality Systems and ISO 9000

**UNIT II STATISTICAL QUALITY CONTROL 7**

Fundamental Statistical Methods, tools such as control charts and sampling methods, control chart techniques and interpretation, selection and collection of data, interpretation of data and statistical inference.

**UNIT III MATERIALS CONTROL 5**

Establishing clear specifications and standardization of materials to be purchased. Inspection and testing of incoming materials as part of quality control, importance of proper handling and maintenance of records of performance of materials, Sampling.

**UNIT IV PROCESS CONTROL 15**

Need for establishing clearly meaningful job specifications and acceptable tolerance limits, process variability and measures of variability, establishing in 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 as part of quality control, ISO standards for process – ISO 12647-1,2 &3, Implementation and Guidelines – Case Study.

**UNIT V QUALITY CONTROL INSTRUMENTATION 10**

Process control instruments, devices and aids used for plate making and press room. Test forms, and elements for quality assurance. Press sheet control devices for colour printing. Minimum instrumentation necessary to produce a product consistent with the appropriate quality level.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Miles Southworth & Donna Southworth, "Quality and Productivity in the Graphic Arts", Graphic Arts Publishing Company, 1990
2. Douglas C.Montgomery, "Introduction to Statistical Quality Control", John Wiley, 1985.

**REFERENCE BOOKS:**

1. Brian Rothery, ISO 9000, "Productivity & Quality", Publishing Private Ltd., 1992
2. Kelvin Tritton, "Colour Control for Lithography", PIRA International, 1992
3. Mortimer,A., "Colour Reproduction in Printing Industry", PIRA International, 1991.
4. Ken Holmes, "Implementing ISO 9000", 2nd edition, PIRA International, 1995
5. Phil Green, "Quality Control for Print Buyers", Blue Print, 1992.

6. Ronald E.Todd, "Printing Inks – Formulation Principles, Manufacture and Quality Control Testing Procedures", PIRA International, 1994.
7. Apfelberg, H.L., Apfelberg, M.J., "Implementing Quality Management in Graphic Arts", GATF, 1995.

**PT8012**

**SECURITY PRINTING**

**L T P C**

**3 0 0 3**

**OBJECTIVE**

- To get an understanding of various security features, materials and methods involved in Security Printing.
- To know the appropriate Printing Techniques for different applications.

**UNIT I INTRODUCTION**

**9**

Need for Security printing – special issues, counterfeiting -Creation & Graphics, Making of a bank note, Circulation & Bank maintenance- RBI specifications- General security aspects of currencies- Importance of Academic and industrial security- types of products – Suitable Printing techniques for various applications

**UNIT II INKS**

**9**

Types of security printing inks, features - metal revealable, migrating, heat reactive, erasable, fugitive, copy-protection, thermal chromic, coin reactive, bleeding, pen reactive, irreversible, visible infrared, penetrating, chemical reactive and optically variable ink (OVI) Introduction, UV Curing, Photo chromic inks, Monochromic Inks, Invisible Phosphorescent inks, Water Resistant Inks.

**UNIT III SECURITY SUBSTRATES**

**9**

Security Fibres, Planchettes, Fluorescent Hilites, Iridescent coating, Security threads, Holographic foil, Colour centred paper, Chemical reactive, chemically void, toner fused paper, visible security fibers, invisible fluorescent fibers and other security papers.

**UNIT IV SECURITY PRINTING TECHNOLOGY**

**9**

Water marking – Digital Watermark -Holograms - UV-visible Printing, rainbow printing, micro lines, guilloches, numbering, Line-printing, stamp embossing, hot-foil-embossing, embossing / punching, customer - designed hologram, blind red printing, solvent colors, multi color UV-fluorescence stitching thread, holographic foil or lamination of a page, Principles of Bar coding, Types of Coding EAN 13 Code, Code 39 ACA etc

## **UNIT V APPLICATIONS**

**9**

Security design and processes for various print products: Barcodes, Holograms, cheque printing- MICR cheques and Reserve Bank of India (RBI) specifications, finishing, paper specifications- Manufacturing process of – Bank Notes – Business forms – Certificates- Passports – Packaging - Card printing. Different types of machines used for producing various security products. Recent trends and developments in security printing.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Martin Monestics, "The Art of Paper Currency", Quarlet Books Ltd., 1983.
2. Leibigner, "Numbering Machines & Systems", Company Leibigner Numbering Systems.

### **REFERENCES:**

1. EIRI Board of Consultants and Engineers "Hand Book of Printing Technology" Engineers India Research Institute, New Delhi
2. Indian Institute of Bankers (1999) "Bank Credit Card Business" Macmillan, Delhi
3. William H. Erdei, "Barcode - Design, Printing & Quality Control", McGraw Hill Inc., 1998.
4. R. Narayanan, "Computer Stationery & MICR – Cheque Production" Association for Research & Development in Printing, 1998.

**PT8013**

**VISUAL COMMUNICATION**

**L T P C**

**3 0 0 3**

### **OBJECTIVE:**

To enable the student to

- a. Understand the Importance of Visual Communication
- b. Understand the vehicles of visual communication and its analysis.
- c. Understand the applications of visual communication

## **UNIT I INTRODUCTION**

**6**

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**

**11**

Psychology of human vision, How the eye and brain process image, Visual grammar, Color form, Depth and movement, Visual theories, Perception, Semiotics, Visual story creation.

**UNIT III VISUAL ANALYSIS****9**

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

**UNIT IV PRINCIPLES OF DESIGN****9**

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****10**

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 a visual event – film, TV, photo exhibit, advertisements, etc. Case studies.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Paul Martin Lester, "Visual Communication; Images with Messages", 3rd Edition, Thomson/Wadsworth, Belmont, California, 2003.
2. Kosternics, Charles and David Roberts, "Designing Visual Language", 2nd Edition, Allyn & Bacon, 1999.

**REFERENCE BOOKS:**

1. Horn, Robert, "Visual Language", Macro UV Publishers, 1999.
2. Gregg Beryman, "Notes on Graphic Design & Visual Communication", Crisp Publications, 1990.
3. Gunther R.Krers, Theo Van Ceeuwen, Routledge, Gunther R.Grers, "Reading Images – The Grammer of Visual Design", Routledge Publishers, 1995.

**MA8353****NUMERICAL METHODS****L T P C****3104****OBJECTIVES:**

To provide the mathematical foundations of numerical techniques for solving linear system, eigenvalue problems, interpolation, numerical differentiation and integration and the errors associated with them; To demonstrate the utility of numerical techniques of ordinary and partial differential equations in solving engineering problems where analytical solutions are not readily available.

**UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton-Raphson method- Solution of linear system of equations - Gauss Elimination method – Pivoting - Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss-Jordan method - Eigenvalues of a matrix by Power method and by Jacobi's method.

**UNIT II INTERPOLATION AND APPROXIMATION 9+3**

Interpolation with unequal intervals - Lagrange interpolation –Newton's divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton's forward and backward difference formulae – Least square method -Linear curve fitting.

**UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3**

Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

**UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATION 9+3**

Single step-methods - Taylor's series method - Euler's method -Modified Euler's method - Fourth order Runge-Kutta method for solving first and second order equations - Multi-step methods - Milne's and Adams-Bashforth predictor-corrector methods for solving first order equations.

**UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9+3**

Finite difference methods for solving two-point linear boundary value problems. Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank-Nicholson) methods - One dimensional wave equation by explicit method.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. Grewal, B.S. and Grewal, J.S., "Numerical methods in Engineering and Science", Khanna Publishers, New Delhi, 9th Edition, 2007.
2. Sankara Rao, K. "Numerical methods for Scientists and Engineers", Prentice Hall of India Private Ltd., New Delhi, 3rd Edition, 2007.



## REFERENCES:

1. Brian Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Education Asia, New Delhi, 1st Edition, 2007.
2. Gerald, C.F. and Wheatley, P.O., "Applied Numerical Analysis", Pearson Education Asia, New Delhi, 6th Edition, 2006.
3. Laurene V. Fausett, "Applied Numerical Analysis using MATLAB", Pearson Education, New Delhi, 1st print, 2nd Edition, 2009.

**MA8356**

**PROBABILITY AND STATISTICS**

**L T P C**

**3104**

## OBJECTIVES:

- To make the students acquire a sound knowledge in statistical techniques that model engineering problems. The Students will have a fundamental knowledge of the concepts of probability.

### **UNIT I      RANDOM VARIABLES**

**9+3**

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions – Functions of a random variable

### **UNIT II      TWO-DIMENSIONAL RANDOM VARIABLES**

**9+3**

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

### **UNIT III      TESTS OF SIGNIFICANCE**

**9+3**

Sampling distributions - Tests for single mean, proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances –  $\chi^2$ -test for goodness of fit – Independence of attributes – Non-parametric tests: Test for Randomness and Rank-sum test (Wilcoxon test).

### **UNIT IV      DESIGN OF EXPERIMENT**

**9+3**

Completely randomized design – Randomized block design – Latin square design - 22-factorial design - Taguchi's robust parameter design.

**UNIT V STATISTICAL QUALITY CONTROL****9+3**

Control charts for measurements ( X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

**TOTAL: 60 PERIODS****TEXT BOOKS:**

1. Milton, J. S. and Arnold, J.C., “Introduction to Probability and Statistics”, Tata McGraw Hill, New Delhi, 4th Edition, 3rdReprint, 2008.
2. Johnson, R.A. and Gupta, C.B., “Miller and Freund’s Probability and Statistics for Engineers”, pearson Education, Asia, 8th Edition, 2011

**GE8751****ENGINEERING ETHICS AND HUMAN VALUES****L T P C****3 0 0 3****UNIT I HUMAN VALUES****10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time– Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality.

**UNIT II ENGINEERING ETHICS****9**

Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION****9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS****9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

## **UNIT V      GLOBAL ISSUES**

**8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Conduct

**TOTAL: 45 PERIODS**

### **TEXTBOOK**

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.

### **REFERENCES:**

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Thompson Wadsworth, A Division of Thomson Learning Inc., United States, 2000
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001

### **WEB SOURCES:**

1. [www.onlineethics.org](http://www.onlineethics.org)
2. [www.nspe.org](http://www.nspe.org)
3. [www.globalethics.org](http://www.globalethics.org)
4. [www.ethics.org](http://www.ethics.org)

**MG8654**

**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 various principles, practices of TQM to achieve quality.

- To learn the various statistical approaches for Quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems

**UNIT I INTRODUCTION 9**

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality - Basic concepts of TQM – TQM Framework - Contributions of Quality Gurus – Barriers to TQM – Cost of Quality.

**UNIT II TQM PRINCIPLES 9**

Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

**UNIT III TQM TOOLS & TECHNIQUES I 9**

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

**UNIT IV TQM TOOLS & TECHNIQUES II 9**

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures - BPR.

**UNIT V QUALITY SYSTEMS 9**

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits –Quality Council – Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward.

**TOTAL : 45 PERIODS**

**TEXT BOOK:**

1. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint , 2006.

## REFERENCE BOOKS:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", (6th Edition), South-Western (Thomson Learning), 2005.
2. Oakland, J.S. "TQM – Text with Cases", Butterworth – Heinemann Ltd., Oxford, Third Edition , 2003.
3. Suganthi,L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006 .
4. Janakiraman,B and Gopal, R.K, "Total Quality Management – Text and Cases",Prentice Hall (India) Pvt. Ltd., 2006.

**IE8071**

**HUMAN RESOURCE MANAGEMENT**

**L T P C  
3003**

## OBJECTIVE:

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

### **UNIT I INDIVIDUAL BEHAVIOR: 9**

Personality –Types –Influencing Personality – Learning Process, Attribute – Perception – Motivation Theories

### **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 & 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**

**TEXT BOOKS:**

1. Stephen R. Robbins, "Organizational Behavior", PHI, 1998.

**REFERENCES:**

1. David A. Decenzo & Stephen R. Robbins, "Personnel/Human Resources Management", PHI, 1997.
2. Fred Lutherans, "Organizational Behavior", Oxford University Press, 2000.

**ME8075****ENERGY CONSERVATION IN INDUSTRIES****L T P C****3 0 0 3****OBJECTIVES:**

At the end of the course, the student is expected to

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

**UNIT I INTRODUCTION****8**

Energy - Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization –Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.

**UNIT II ELECTRICAL SYSTEMS****12**

Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors - Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.

**UNIT III THERMAL SYSTEMS****12**

Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam:Distribution &Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories

**UNIT IV ENERGY CONSERVATION IN MAJOR UTILITIES****8**

Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets

## **UNIT V ECONOMICS**

**5**

Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concept

**TOTAL: 45 PERIODS**

### **TEXT BOOK:**

1. Energy Manager Training Manual(4 Volumes) available at [www.energymanagertraining.com](http://www.energymanagertraining.com), a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India.2004.

### **REFERENCES:**

1. L.C. Witte, P.S. Schmidt, D.R. Brown, “Industrial Energy Management and Utilisation” HemispherePubl, Washington, 1988.
2. Callaghn, P.W. “Design and Management for Energy Conservation”, Pergamon Press, Oxford, 1981.
3. I.G.C. Dryden, “The Efficient Use of Energy” Butterworths, London, 1982
4. W.C. turner, “Energy Management Hand book” Wiley, New York, 1982.
5. W.R. Murphy and G. Mc KAY “Energy Management” Butterworths, London 1987.

**ME8076**

**ENTREPRENEURSHIP DEVELOPMENT**

**L T P C**

**3 0 0 3**

### **OBJECTIVE:**

- Study of this subject provides 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**

**9**

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

## **UNIT II MOTIVATION**

**9**

Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives.

### **UNIT III BUSINESS**

**9**

Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

### **UNIT IV FINANCING AND ACCOUNTING**

**9**

Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, management of working Capital, Costing, Break Even Analysis, Network Analysis Techniques of PERT/CPM – Taxation – Income Tax, Excise Duty – Sales Tax.

### **UNIT V SUPPORT TO ENTREPRENEURS**

**9**

Sickness in small Business – Concept, Magnitude, causes and consequences, Corrective Measures – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

**TOTAL: 45 PERIODS**

#### **TEXT BOOKS:**

1. S.S.Khanka “Entrepreneurial Development” S.Chand & Co. Ltd. Ram Nagar New Delhi, 1999.
2. Kuratko & Hodgetts, “Enterprenuership – Theory, process and practices”, Thomson learning 6th edition.

#### **REFERENCES:**

1. Hisrich R D and Peters M P, “Entrepreneurship” 5th Edition Tata McGraw-Hill, 2002.
2. Mathew J Manimala,” Enterprenuership theory at cross roads: paradigms and praxis” Dream tech 2nd edition 2006.
3. Rabindra N. Kanungo “Entrepreneurship and innovation”, Sage Publications, New Delhi, 1998.
4. EDII “ Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development” Institute of India, Ahmadabad, 1986.



**OBJECTIVE:**

To impart knowledge in reliability concepts, reliability estimation methods and reliability improvement methods

**UNIT I RELIABILITY CONCEPT****9**

Reliability definition –Reliability parameters-  $f(t)$ ,  $F(t)$  and  $R(t)$  functions- Measures of central tendency – Bath tub curve – A priori and posteriori probabilities of failure – Component mortality - Useful life.

**UNIT II LIFE DATA ANALYSIS****9**

Data classification – Non parametric methods: Ungrouped, Grouped, Complete, Censored data – Time to failure distributions – Probability plotting: Exponential, Weibull - Goodness of fit tests – Survival graphs.

**UNIT III RELIABILITY ESTIMATION****9**

Series parallel configurations – Parallel redundancy –  $m/n$  system – Complex systems: RBD approach – Baye's method – Minimal path and cut sets - Fault Tree analysis – Standby system.

**UNIT IV RELIABILITY MANAGEMENT****8**

Reliability testing: Failure terminated test – Time terminated test – Upper and lower MTBFs – Sequential Testing – Reliability growth monitoring – Reliability allocation.

**UNIT V RELIABILITY IMPROVEMENT****10**

Analysis of downtime – Repair time distribution – Maintainability prediction – Measures of maintainability – Availability definitions – System Availability – Replacement decisions – Economic life.

**TOTAL: 45 PERIODS****REFERENCES:**

1. An Introduction to Reliability and Maintainability Engineering, Charles E.Ebeling, TMH, 2000.
2. Roy Billington and Ronald N. Allan, Reliability Evaluation of Engineering Systems, Springer, 2007.

**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 Nanoparticles
- Characteristic techniques of Nanomaterials

**UNIT I INTRODUCTION TO NANOMATERIALS 9**

Amorphous, crystalline, microcrystalline, quasi-crystalline and nano-crystalline materials. Classification of Nanomaterials – Size Effects – Surface to volume ratio, Strain confinement, Quantum Effects – Properties – Mechanical, Thermal, Electrical, Optical, Magnetic, Acoustic.

**UNIT II SYNTHESIS OF NANOMATERIALS 12**

Methods of production of Nanoparticles – Top–Down processes, Bottom-Up Processes - Sol-gel synthesis, Inert gas condensation, Sonochemical processing, Molecular self assembly, High energy Ball milling, Plasma synthesis, Electro deposition, Chemical vapour deposition, Physical vapour deposition, and other techniques. Synthesis of Carbon Nanotubes – Solid carbon source based production techniques, Gaseous carbon source based production techniques - Issues in fabrication of nanomaterials Nano wires.

**UNIT III CHARACTERISATION OF NANOMATERIALS 9**

Scanning Probe Microscopy (SPM) – Scanning tunneling microscope, Transmission electron microscope, Scanning transmission electron microscope, Atomic force microscope, Scanning force microscopy, Electrostatic force microscopy , Dynamic force microscopy, Magnetic force microscopy, Scanning thermal microscopy, Peizo force microscopy, scanning capacitance microscopy, Nano indentation - Issues in characterization of nanomaterials.

**UNIT IV APPLICATIONS OF NANOMATERIALS 9**

Applications in Mechanical, Electronics engineering industries – Use of nanomaterials in automobiles, aerospace, defense and medical applications – Metallic, polymeric, organic and ceramic nanomaterials.

**UNIT V NANO FABRICATION AND MACHINING 9**

LIGA, Ion beam etching, Molecular manufacturing techniques – Nano machining techniques – Top/Bottom up Nano fabrication techniques - Sub micron lithographic technique, conventional film growth technique, Chemical etching, Quantum materials.

**TOTAL: 45 PERIODS**

## **TEXT BOOKS:**

1. Bhushan B., "Handbook of Nanotechnology", Springer, Germany, 2004.
2. Ashby M.F., Ferreira P.J. and Schodek D.L., "Nanomaterials, Nanotechnologies and Design", Elsevier Ltd., 2009.

## **REFERENCES:**

1. Ratner M. and Ratner D., "Nano Technology", Pearson Education, New Delhi, 2003.
2. Timp G., "Nanotechnology", Springer, India, 2005.
3. Busnaina A., "Nanomanufacturing Handbook", CRC Press, London, 2006
4. Lakhtakia A., "Nanometer Structures – Theory, Modeling and Simulation", PHI Learning Private Limited, NewDelhi, 2009.

**MF8079**

**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**

Condition monitoring - Infrared Thermography, Oil Analysis, acoustic emissions testing, Motor Current Analysis, Vibration Measurement and Analysis, Wear Debris Monitoring, Visual checks - corrosion control - Maintenance Management Information System - Expert system applications.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS :**

1. Nakajima S., "Introduction to TPM", Productivity Press, Chennai, 1992.
2. Srivastava S.K., "Maintenance Engineering (Practices & Management)", S. Chand Group, 2011.

### **REFERENCES :**

1. Wireman T., "Total Productive Maintenance", Industrial Press Inc., New York, 2004
2. Goto F., "Equipment planning for TPM Maintenance Prevention Design", Productivity Press, 1992.
3. Shirose K., "Total Productive Maintenance for Workshop Leaders", Productivity Press, 1992.
4. Shirose K., "TPM for Operators", Productivity Press, 1996.
5. Suzuki T., "New Directions for TPM", Productivity Press, 1993.
6. Kelly A., "Maintenance planning and control", Butterworths, London, 1991.