

# S.E. (PRINTING), 2008 COURSE

## Part I

### 207004 ENGINEERING MATHEMATICS – III (2008 Course)

Teaching Scheme:  
Lectures: 4 hrs./week

Examination Scheme:  
Paper: 100 marks  
Duration: 3 hrs.

#### Section I

**Unit I:** Linear Differential Equations (**LDE**) (09 Hours)  
Solution of  $n^{\text{th}}$  order LDE with Constant Coefficients, Method of Variation of Parameters, Cauchy's & Legendre's DE, Solution of Simultaneous & Symmetric Simultaneous DE.

**Unit II:** Applications of DE (09 Hours)  
Applications of LDE to chemical engineering problems involving batch reactions and mass spring systems.

Solution of Partial Differential Equations (**PDE**)  
(1)  $\partial u / \partial t = a^2 (\partial^2 u / \partial x^2)$ , (2)  $\partial^2 u / \partial t^2 = a^2 (\partial^2 u / \partial x^2)$  and (3)  $(\partial^2 u / \partial x^2) + (\partial^2 u / \partial y^2) = 0$   
by separating variables only. Applications of PDE to problems of Chemical and allied engineering.

**Unit III:** Fourier Transform (**FT**) (09 Hours)  
Fourier Integral theorem. Sine & Cosine Integrals. Fourier Transform, Fourier Cosine Transform, Fourier Sine Transforms and their inverses. Finite FT, Application of FT to problems on one and two dimensional heat flow problems.

#### Section II

**Unit IV:** Laplace Transform (**LT**) (09 Hours)  
Definition of LT, Inverse LT. Properties & theorems. LT of standard functions. LT of some special functions viz. error, 1<sup>st</sup> order Bessel's, Periodic, Unit Step, Unit Impulse, ramp, jump, parabolic, Si(t) and Ei(t). Problems on finding LT & inverse LT.

**Unit V:** Vector Calculus (09 Hours)  
Physical Interpretation of Vector Differentiation. Radial, Transverse, Tangential & Normal components of Velocity and Acceleration. Vector differential operator. Gradient, Divergence & Curl. Directional derivative. Vector identities. Line, Surface & Volume integrals. Work done. Conservative, Irrotational & Solenoidal fields. Scalar potential. Green's Lemma, Gauss's Divergence and Stoke's Theorem.

**Unit VI:** Applications of Laplace Transforms & Vector Calculus (09 Hours)  
Applications of Vectors to problems in Fluid Mechanics, Continuity equations, Stream lines, Equations of motion, Bernoulli's equations.  
Applications of LT for solving ordinary differential equations, liquid level systems, consisting of single tank and two tanks in series (interacting and non-interacting systems), second order systems (damped vibrator).

#### Text Books:

1. Advanced Engineering Mathematics by Peter V. O'Neil (Cengage Learning).
2. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.).

**Reference Books:**

1. Engineering Mathematics by B.V. Raman (Tata McGraw-Hill).
2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
3. Advanced Engineering Mathematics, Wylie C.R. & Barrett L.C. (McGraw-Hill, Inc.)
4. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).
5. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune).
6. Advanced Engineering Mathematics with MATLAB, 2e, by Thomas L. Harman, James Dabney and Norman Richert (Brooks/Cole, Thomson Learning).

# Strength of Machine Elements (202281)

## Teaching scheme

Lectures - 4 Hours/Week

## Examination scheme

Paper - 100 Marks

### SECTION – I

#### UNIT - I Simple stresses & strains

Introduction to Engineering materials, their classification, designation & applications

Mechanical properties - strength, hardness, toughness, ductility, malleability, stiffness, resilience, fatigue, endurance limit & creep.

Types of stresses & strains, Hooke's Law, stress - strain diagram for ductile & brittle materials, allowable stress, factor of safety, modulus of elasticity, modulus of rigidity, volumetric strain, bulk modulus, Poisson's ratio, relationship between elastic constants, thermal stresses & strains, thermal stresses in composite sections.

#### UNIT - II Shear Force & Bending Moment Diagrams of Beams

Concept of SFD & BMD

SFD & BMD for cantilevers, simply supported beams & over hanging beams subjected to point load Uniformly Distributed Load, Uniformly Varying Load and couple, Point of contra- flexure

Relation between SF, BM and rate of loading at a section of a beam,

Loading diagram from SFD and BMD, Numericals on above,

#### UNIT - III Bending and Shear stresses

Bending stresses- Theory of simple bending, derivation of Flexural formula, area centre & moment of inertia of common cross sections such as rectangular, circular, T, I & C sections. Moment of resistance, section modulus calculations for above sections. Beams of uniform strength.

Shear stresses-Introduction, assumptions, derivations of shear stress formula.

Shear stress distribution diagram for common cross-sections such as rectangular, circular, T, I & C sections.

### SECTION – II

#### UNIT - IV Axially Loaded Columns and Torsion in circular shafts

Axially Loaded Columns - Concept of buckling of columns, Derivation of Euler's formula for buckling load for column with hinged ends, concept of equivalent length for various end conditions, Limitations of Euler's formula, Rankine's buckling load, Johnson's buckling load, safe load on column

Torsion in circular shafts-Stresses, strains and deformations in solid and hollow shafts, homogeneous and composite circular cross sections subjected to torsion, Derivation of torsion equation. Stresses subjected to combined torsion, bending and axial force on shafts. Shafts in series & parallel.

## **UNIT - V Principal Stresses & Strains, Theories of Elastic Failure, Strain Energy & Impact**

Principal Stresses & Strains -Normal shear stresses & strains on oblique plane, concept of principal planes, derivation of principal stresses & maximum shear stresses, position of principal planes & planes of Maximum shear, graphical solution using Mohr's circle.

Theories of Elastic Failure-Maximum principal stress theory, Maximum shear stress theory & distortion energy theory.

Strain Energy & Impact -Concept of strain energy, derivations & use of expression for deformations of axially loaded members under gradual, sudden & impact loads, strain energy due to self load, strain energy due to shear, strain energy due to bending, strain energy due to torsion.

## **UNIT - VI Slope and Deflection of Beams**

Importance of deflection in practical applications.

Relation between bending moment and slope, slope and deflection of statically determinate beams.

Derivation of equations for slope & deflection of beams in case of cantilevers & simply supported beams loaded with point loads, uniformly distributed loads & couple

Determination of slope & deflection for cantilevers, simply supported beams & beams with overhang, subjected to point loads & uniformly distributed load by double integration method, Macaulay's method.

### **Text Books**

1. S. Ramamrutham, "Strength of Materials", Dhanpat Rai and sons
2. S.S.Bhavikatti," Strength of Materials", Vikas Publication
3. Junnarkar and Shah," Mechanics of structures Vol-I", Charotar Book Co.

### **Reference Books**

1. E.P.Popov," Introduction to Mechanics of Solids", Prentice Hall Publishers
2. Singer and Pytel," Strength of Materials", Harper and Row Publications.
3. Beer F.P. & Johnston E.R,"Mechanics of materials", Mc Graw Hill publications.

## **Basic Elements of Printing Technology (208282)**

### **Teaching Scheme**

Lectures - 4 Hours/Week

Marks

Practical - 2 Hours/Week

50 Marks

### **Examination Scheme**

Paper - 100

Term Work - 25 Marks

Practical -

## **SECTION - I**

### **UNIT - I Pre-Press**

Printing Workflow, Typography – 2D & 3D Type faces, Family, Series of type, legibility readability of type, type measurement, type alignment & arrangement, DTP Conversion to film output –negative, positive & tracing Surface preparation for letterpress lithography screen gravure flexo.

### **UNIT - II Press**

Principles of printing, different printing processes Configuration of machines, machine parts & accessories. Introduction to non-conventional printing processes – pad printing, dry offset, waterless offset.

### **UNIT - III Post –Press**

Finishing techniques-Punching, embossing, foiling, lamination, varnishing, spot UV, Binding techniques- Hard Binding, Paper back Binding, Mechanical loose leaf binding

## **SECTION -II**

### **UNIT - IV Basics Of design**

Introduction to graphic design, fundamental of design, principle of design Division of design – natural, conventional, decorative, geometric, abstract

### **UNIT - V Layout and color.**

Stages of layout – thumbnails, rough layout, comprehensive layout, artwork, Design for magazines, newspaper, catalogues, cartons, commercial stationary, flexible pouches Color Definition of color, additive and subtractive theory, Dimensions of color, color schemes, color symbolism

### **UNIT - VI Visualization and advertising agency**

Visualizing 3D effects from 2D effect drawing, vector and raster images, and softwares for print designing – data entry, illustrations and images. Advertising art, advertising agency structure, functions, services.

## **Term Work**

Term Work shall consist of following **Eight** experiments;

- 1) To prepare screen and cut stencil method
- 2) To print single color job by screen printing process
- 3) To prepare the screen by photographic method.
- 4) To print multicolor job by screen printing process
- 5) Study of Corel Draw
- 6) To reproduce a typographical logo
- 7) To reproduce graphical logo
- 8) To reproduce designer logo

## **Reference Books**

1. Penny and Ann Dolin, Printing technology 5E
2. Rogue C. Parker, Looking Good in print – A guide to basic Design for Desktop publishing.
3. Roger C. Parker, 101 solutions for Desktop publishing
4. Alastair Campbell, The Designers handbook
5. N. N. Sarkar, Art and Production. Revised edition Sagar publication
6. Krishnamurthy, Modern printing processes
7. Mulvihil, Flexography primer

# Printing Digital Electronics (208283)

## Teaching Scheme Scheme

Lectures - 4 Hours/Week  
Marks  
Practical - 2 Hours/Week  
Marks

## Examination

Paper - 100  
Term Work - 25

### SECTION - I

#### UNIT - I Introduction of number system

Decimal, Binary, Octal Hexadecimal number systems and their conversions. BCD codes, 8421, Excess - 3, Gray Code, ASCII code. Concept of bar code and its application in printing.

#### UNIT - II Fundamentals of Digital Electronics

Boolean algebra, De-Morgan theorems, all types of gates and their truth tables. Need of minimization, Minimization techniques, K-map simplification up to 4 variables, SOP and POS forms; don't care conditions, Logic families, and comparative study of TTL, ECL and CMOS.

#### UNIT - III Combination logic and Arithmetic

Combination logic and Arithmetic such as addition, subtraction, 1's complement and 2's complement method. Binary multiplication and division. Half adder / Half subtractor, Full Adder / Full Subtractor, BCD adder. One bit digital comparator Concept and Application of ALU.

### SECTION - II

#### UNIT - IV Sequential logic circuits and their applications in printing

Study of level clocked S-R,D, JK, M-SJK flip-flops (Includes logical diagrams, symbol truth - table, waveforms / timing diagrams). Edge triggered flip flops (includes S-R, D, JK, M-S Jk flip-flops along with logical diagram, symbol truth table, waveforms / timing diagram) Study of asynchronous and synchronous counters and their applications such as paper counting. Roller speed measurements etc Concept of modulo 'N' counter, UP/Down counter. Principle operation of Universal shift register (IC 7495 including all modes of operation - concept only) and its application in printing.

#### UNIT - V Digital signals and its storage and display

Introduction to ADC's and DAC's (includes classification and specifications in brief), Classification of Memories, study of RAM, ROM, EPROM, E PROM, NVRAM, SRAM, DRAM, concept of PLA, PAL and PLD's. Display Devices and decoders 7 segment LED display (includes basic diagrams of Common Anode and Common Cathode) study of decoder driver IC's such as IC 7447, 7448, LCD display & Display Drivers IC's such as 7106, 7107.

## UNIT - VI Introduction to Digital Computer

Block diagram of digital computer, serial port / parallel port concept, Input devices such as Keyboard, Mouse, Joystick, Output Devices such as Printers (includes classification and one application of each), Floppy Disks, CD's concept of Modern, special accessories such as Digital Camera and Digital Scanner.

### Term Work

Term Work shall consist of following **Ten** experiments;

1. Logic gates – I
  - a) Verification of truth-tables for fundamentals and derived gates (AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR)
  - b) NAND and NOR gates as universal gates
2. Logic gates - II
  - a) Verification of Boolean laws and theorems using logic gates.
  - b) Verification of SOP and POS form by K-map (up to 4 variables only) using logic gates.
3. Comparative study of TTL and CMOS (Parameter measurement for any simple functional circuit using TTL IC and CMOS IC)
4. Study of code conversions and their applications in printing
  - a) Binary to gray and gray to binary.
  - b) Bar code evaluation
5. Arithmetic Circuits
  - a) Half and Full Adder / Half and Full Subtractor functionality verification.
  - b) One bit digital comparator.
6. Combinational Circuits
  - a) Study of multiplexers and demultiplexers.
  - b) Study of Encoders and Decoders
7. Sequential Circuits
  - a) Study of flip-flops SR, D, JK, T, M-SJK for both level and Edge triggered clock.
8. Sequential circuits II
  - a) Ripple, Ring & Johnson Counter with application related to printing.
  - b) Study of mod N counter using IC 7490, IC 7492, IC7493 with application related to printing.
9. Study of Shift Register IC 749 and its application in printing.
10. Study of ADC & DAC IC (8 bit only) or  
Study of or Display Devices and Drivers
  - a) LED display (one type only)
  - b) LCD display (one type only)



**Text Books**

1. R. P. Jain - Modern Digital Electronics Tata McGraw Hill Publication.
2. Gothman - Digital Electronics - An introduction to theory and practice Prentice Hall Publication.

**Reference Books**

1. Malvino and Leach Digital Electronics - Principles and applications - Prentice Hall Publication.
2. Tocci Digital systems Principles and application (6<sup>th</sup> edition) - Prentice Hall Publication.

# Technology of Printing Materials (208284)

## Teaching Scheme

Lectures - 4 Hours/Week

Practical - 2 Hours/Week

## Examination Scheme

Paper - 100 marks

Term Work - 25 marks

Practical - 50 marks

## SECTION I

### UNIT - I Metals, Polymers and Plastics

Metals used as image carriers in Letterpress, Lithography, Gravure and in inking system for Lithography, Flexo and other printing processes. Introduction to polymer, Thermo set & thermoplastic polymer, natural & synthetic polymer, application of polymers in printing industry. Introduction to plastic substrates, grades of plastic substrates for printing and packaging, Properties of plastics used in printing and packaging, methods of identification of plastics.

### UNIT - II Printing Chemicals & Consumables

Silver Halide and other photographic emulsions, its ingredients and structure used in different printing processes, manufacturing, role of different developers used in development of the photographic image, role of fountain solution, adhesives - natural synthetic and their use in printing and packaging.

**UNIT -III Printing Inks** Classification & General characteristics of printing inks, ingredients of printing ink pigments, Vehicles and additives etc. Manufacturing of printing ink, general formulation of printing ink

## SECTION- II

### UNIT – IV Properties & Testing of Printing Inks

Printing ink drying methods, Rheological properties of ink like viscosity, shear, yield, thixotropy, length of ink, tack, set off, trapping, filling, caking, end use properties etc. subjective & objective ink testing methods.

### UNIT – V Paper Manufacturing

Importance of paper and paper products in printing industry, fibrous & non-fibrous materials & its importance in paper, paper manufacturing process & different machines used for manufacturing the paper, Different surface finishes obtained in paper.

### UNIT -VI Properties & Testing of Paper

Physical properties of paper such as thickness, density, tensile, tearing, folding strength. Chemical properties of paper, Optical properties of paper like gloss, brightness and opacity. Importance of BIS standards for different grades of paper & its relation to printing industry.

## **Term Work**

### **A. Testing of printing inks**

1. To study physical properties of an ink
2. To take a drawdown of paste ink
3. To take a print of paste ink
4. To take a print of liquid ink by bar coater
5. To take a print of liquid ink by flexo lab printer
6. To measure the viscosity of paste ink
7. To measure the viscosity of liquid ink
8. To study the end use properties of an ink

### **B. Testing of substrate**

1. To find GSM of substrate
2. To find caliper thickness of substrate
3. To find top and bottom side of paper
4. To find cross and machine direction of paper
5. To find Cobb value of paper
6. To measure opacity of substrate
7. To measure brightness and gloss of substrate
8. To measure smoothness and porosity of substrate
9. To identify various types of plastic films

## **Reference Books**

1. L.C. Young, Printing Science
2. L.C. Young, Materials in Printing Processes
3. Leach and Pierce, Printing Ink Manual
4. Dr. Nelson R. Eldred, What Printer Should Know About Ink, GATF
5. Dr. Nelson R. Eldred, What Printer Should Know About Paper, GATF
6. E.A. Apps, Printing Ink technology
7. A. J. Athaley, Plastics in Packaging
8. R. Holman, Technology of Printing Inks
9. C.H.Williams, Printing Ink Technology
10. K.W. Britt, Handbook of Pulp and Paper technology
11. P.J.Hartsuch, Chemistry of Lithography

# **Print Layout and Design (208285)**

## **Teaching Scheme**

Practical - 2 Hours/Week

## **Term Work**

- 1) Introduction to Adobe CS3
- 2) To design a pamphlet in Adobe In Design
- 3) To design a brochure in Adobe In Design
- 4) To design a bookwork in Adobe In Design
- 5) Introduction to Adobe Photoshop CS3
- 6) To select an image in Adobe Photoshop CS3
- 7) Image editing in Adobe Photoshop CS3
- 8) Application of different filters

## **Examination Scheme**

Term Work - 50 Marks

## **Workshop Practice I (211286)**

### **Teaching Scheme**

Practical - 2 Hours/Week

### **Examination Scheme**

Term Work - 25 marks

### **Term Work**

Each candidate is required to complete and submit one Composite Job consisting of machining of components covering operations on - Lathe, Drilling, Milling , shaping Machines and essentially consists of Thread Assembly.

## Part II

### Electrical Machines & Utilization (203287)

#### Teaching Scheme

Lectures - 4 Hours/Week

Practical - 2 Hours/Week

#### Examination Scheme

Paper - 100Marks

Term Work - 25 Marks

Oral - 25 Marks

#### SECTION – I

##### UNIT – I D.C. Motors

D.C. Generator- Construction & Principle of working, Types of D.C. Generator, EMF Equation

D.C. Motors- Working Principle, Back EMF, Types of motors, Torque Equation, Characteristics of Motors, Starting & Reversing, Speed Control Methods of Shunt and Series Motors, Necessity of Starters, Two and Three Point Starters, Efficiency & Losses, Applications of Shunt & Series motors

##### UNIT – II Three Phase and Single Phase Induction Motor

Three Phase Induction Motor- Basic Principle of Operation, Production of Rotating Magnetic Field, Types of Induction Motors, Slip, Current, Power and Torque Relations, Torque-Slip Characteristics, Relationship Between Rotor Copper Loss, Slip and Rotor Output, Different Types of Starters, Speed Control of Induction Motors, Applications.

Single Phase Induction Motor- Principles of Operation of Single Phase Induction Motors, Starting Techniques of Single Phase Induction Motors (Split Phase & Shaded Pole), Applications

##### UNIT – III Special Purpose Motors and Drives

Special Purpose Motors- Servo Motors, Stepper Motor and Universal Motor (Construction & Applications), Introduction to Synchronous motors – special features.

Drives- Advantages of Electrical Drives, Individual & Group Drive, Selection of motors depending on load characteristics

#### SECTION - II

##### UNIT – IV Measurement of Power in Three Phase Circuit

Star and Delta Connections (brief review), Power Measurement in Three Phase Circuit by Two Wattmeter & Single Wattmeter Method, Reactive Power Measurement with two wattmeter method

Special Components in Printing Industry- Introduction, Various Types of Relays, Contractor, Limit Switches, Proximity Switches, Micro Switches, Solenoids, Photo Cells, Electric Encoders etc.

### **UNIT - V Electrical Heating**

Advantages of Electrical Heating, Resistance and Arc Heating, Principal of Induction Heating and Dielectric Heating, Furnaces, Temperature Control of Furnaces. Application of Different Heating Methods

### **UNIT – VI Illumination, Energy Conservation and Safety in Printing Industry**

Illumination- Laws of Illumination, Inverse Square law, Lambert's Cosine Law, Requirements of Good Lighting Scheme, Special Purpose Lighting

Energy Conservation and Safety in Printing Industry- Introduction & Necessity for energy conservation , Methods of energy conservation, Application in Printing Industry, Safety & Maintenance of Printing Industry

### **Term Work**

Term work should consist of any 7 experiments from 1 to 9 of the above list and 1 compulsory report of industrial visit.

- 1) To measure reactive power consumed by a balanced three phase inductive load by single wattmeter method.
- 2) To measure power in three phase, three wire balanced load circuit using two wattmeter
- 3) Speed control of D.C. Shunt Motor by variation of armature voltage and field current.
- 4) Brake test on D.C. Shunt Motor
- 5) Load test on D.C. Series Motor
- 6) Load test on Three Phase Induction Motor
- 7) To study of various starters used for Three Phase Induction Motors.
- 8) Study of various Single Phase Induction Motors.
- 9) A report on Industrial Visit to any one of place given below where students can observe a] Various Motors b] Industrial Furnace c] Electrolysis Process

### **Text Books**

- 1) S.K. Battacharya, Electrical Machines TTTI Chandigarh
- 2) Manikandan, Electrical Machines & Drives, Scitech Publications, Chennai
- 3) Ashfaq Husain, Fundamentals of Electrical Engineering, Dhanpat Rai & Co.Ltd.
- 4) H.Pratab, Art & Science of Utilization of Electrical Energy, Dhanpat Rai & Com.

### **Reference Books**

1. E.O. Taylor, Utilization of Electrical Energy, Orient Longman
2. Theodore Wildi, Electrical Machines, Drives and Power Systems, Fourth Edition, Pearson Education

# Reproduction Techniques (208288)

## Teaching Scheme

Theory: - 4 Hours/Week

Practical - 2 Hours/Week

## Examination Scheme

Paper - 100 Marks

Practical - 50 Marks

## SECTION – I

### UNIT - I Originals for Reproduction

Study of different types of Artworks Sketches, Paintings, Photographs, Color & Grayscale, High key, low key original, Creating Digital artworks, and Basic properties of originals required for reproduction.

### UNIT - II Films for Reproduction

Line & halftone techniques, Photographic Chemistry and film manufacture, Sensitometry, Review of old techniques of Film processing, Advanced film processing, After treatments, Comparing old and modern prepress techniques.

### UNIT – III Image Reproduction

Basic requirement of Halftones, methods of converting continuous tone to Halftone, AM, FM & hybrid screening, Dot reproduction, Separation filters, Filter factor, Filter ratio, CC-Filters, Color separation-Direct & Indirect separation, Color correction- Masking methods, Color correction in DTP – Tonal Gradation Curve, UCR, GCR, UCA., Black Printer, Quality control aids—Gray scale, color control strip, patches, screen angle finder, dot gain, slur, trapping

## SECTION - II

### UNIT - IV Understanding Densitometry

Study of Densitometer, Transmission Densitometer, Reflection Densitometer, Density relationship, Characteristics curve, Different types of density – Specular & Diffuse density, Optical dot area, Physical dot area, Dot gain/Loss, Print Contrast, Efficiency, Grayness, Hue error, Ink Trapping, ANSI, DIN standards

### UNIT –V Digital Imaging

Study of Digital Input systems like Scanners- Flatbed scanner, Drum Scanner, Copy dot scanner, X-Y Scanner, CCD, CMOS, Image resolutions, Digital Camera – Camera Resolution, Lenses, Focal length, Iris Diaphragm, Aperture, Shutter, Camera Operation, Camera types – One shot triple matrix,



Multishot single matrix, A/D, D/A converter, Pixel aspect ratio.

### **UNIT –VI     Retrieval of Graphics on Screen**

Basic CRT structure, Phosphors for additive receiver, Different types of Displays like – LCD, Shadow mask, Laser, Plasma, Trinitron. Beam penetration tubes, LED Display.

#### **Term Work**

Term Work shall consist of following **Eight** experiments

- 1) To study various types of conventional Originals, Digital Originals and Resolution
- 2) To study Halftone dot structures, AM & FM, FAM
- 3) To scan a photograph
- 4) To scan a pre-printed original
- 5) To apply UCR, GCR and tonal gradation curves in Photoshop
- 6) To study working of Densitometer, measurement of ink and paper densities, dot  
Area, dot gain, contrast, trapping
- 7) To study elements of Control strips & measurement
- 8) To study digital camera operations

#### **Reference Books**

- 1) Hemlut Kipphan, Handbook of Print Media
- 2) Leo, Manual of Graphic Design
- 3) Eric Chambers, Manual of reproduction for Lithography
- 4) R.W.G. Hunt, The Reproduction of Color, Wiley-IS and Series in Imaging Science and Technology.

## **Print Finishing (208289)**

### **Teaching Scheme**

Theory - 4 Hours / Week  
Practical - 2 Hours / Week

### **Examination Scheme**

Paper - 100 Marks  
Term Work - 25 Marks

## **SECTION I**

### **UNIT – I Classification of Binding Techniques**

Brief Introduction to Print Finishing, Classification of binding,-Quarter bound, half bound, full bound / cloth, leather / Foam rexine  
Tools & equipment used in finishing operations.

### **UNIT – II Materials used in Binding**

Materials used in print finishing and properties and standards  
Testing of materials, Securing, reinforcing, covering, adhesives, miscellaneous materials

### **UNIT – III Pre-forwarding and Forwarding Operations**

Pre- forwarding operations - automation in respective operations. forwarding operations  
Utility operations - Ruling, index cutting, numbering, punching, perforating, corner cutting, tabbing, calendar rimming, spiral, comb and wire-o binding, eye-letting, tag stringing etc.

## **SECTION II**

### **UNIT – IV Imposition Schemes and Inventory Management**

Imposition schemes and rules for hand folding and machine folding  
Organization and workshop layout, Inventory, storage and stock management

### **UNIT – V Costing and Estimation for Finishing Operations**

Material calculation and cost estimating for finishing operations Estimation for finished job including paper, other raw material, processing charges etc.

### **UNIT – VI Automation in Print Finishing**

Equipments used, Cutting machines, wire stitching machines, Thread sewing, Perfect Binder, Case making, Wet and heat seal laminations, foil stamping- Hot & cold, other ancillary machines  
Use of robotics or mechanical handling systems.

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### **Term Work**

Term Work shall consist of following **Eight** experiments

1) To prepare saddle stitched booklet.

- 2) To prepare side stitched booklet.
- 3) To prepare quarter bound book - cutflush - french sewn.
- 4) To prepare quarter bound book - ASTI - kettle stitch.
- 5) To prepare half bound book.
- 6) To prepare full bound book.
- 7) To prepare folding schemes-portrait
- 8) To prepare folding schemes-Landscape

### **Reference Books**

- 1) A. G. Martin, Finishing process in Printing Focal Press, London.
- 2) B. D. Mendiratta, Binding & Finishing Printek Publication, New Delhi.
- 3) Hassy Whetton, Practical Printing & Binding Ohams Press Ltd. London.
- 4) Pocket pal, International Paper Company, U.S.A.
- 5) Book on binding and finishing, GATF

# **Microprocessor & Microcontroller Techniques in Printing (208290)**

## **Teaching Scheme Scheme**

Lectures - 4 Hours/Week  
Practical - 2 Hours/Week

## **Examination**

Paper - 100 Marks  
Oral - 25 Marks

## **SECTION - I**

### **UNIT - I Introduction of Microprocessor**

Microprocessor Architecture and its operation, Study of 8085 Microprocessor Pin out and Signals, Memory organization and Memory Mapping, Interfacing devices and review of input / output devices, Latches Buffers Decoders as 74245, 74139. Block diagram and working of 8085 based microcomputer system.

### **UNIT - II Programming Concepts of Microprocessor**

Classification of Instructions, Instruction format, Instruction timing and operation status, Program writing skills of Hand Coding, Expected execution for simple programs, Assembly language programs and debugging, Addressing Modes, Status of Flags, Data transfer, Arithmetic, Logical operations with 16 bit, Counters and Timing Delays. Debugging, Stack and Subroutines, Introduction of Assembler Programming.

### **UNIT - III Introduction of Microcontrollers**

Architecture of 8051. Comparison with microprocessor, Pin diagram, clock and oscillator, flags, PSW, stack, Internal memory, ideal mode, power mode, SFR, Counter, Timer mode, Serial I/O and Interrupt structure.

## **SECTION - II**

### **UNIT - IV Programming concepts of Microcontroller**

Instruction set and programming of 8051. Bus standards such as RS232-C, RS485 and IEEE488

### **UNIT - V Interfacing Peripheral Devices**

Basic Interfacing concepts, Interfacing input keyboard, interfacing output display [LED/LCD], Study of 8279 keyboard / display interface, Memory interfacing, Interfacing Devices study such as 8155 and 8255. Interrupts and Interrupt Handling. Study of Interrupt Controller chip 8259. Study of 8253, 8257, 8251 with Block Diagram and one example of interfacing.

### **UNIT-VI Microprocessor and Microprocessor Applications in Printing Technology**

Stepper Motor Drive and Controller, Printer Interfacing with 8085, Colors Monitor Controller, Microprocessor based Sequence Controller, Concept of Programmable logic controller, with block diagram and simple programming (8 bit) related to specific printing operation sequence. Study of Offset Press and Paper Cutting Machine.

## **Term Work –**

Term Work shall consist of following **TEN** experiments;

1. Write and execute Programs for
  - a) Addition, Subtraction (8 bit and 16 bit)
  - b) Multiplication, division (8 bit)
2. Write and Execute Programs for
  - a) Time delay using Register Pair
  - b) Decade counter
  - c) Up / Down Counter
  - d) Pulse Timing for Flashing Lights
3. Study of interfacing chips 8279
  - a) Chip study waveform Observation
  - b) Program related to printing field application
4. Write and Execute a Program for Serial Data Transfer.
5. Study of Interrupt Controller 8259
6. Interfacing with ADC/DAC (8 bit only)
7. Interfacing of Stepper Motor
8. Study of 8255 Chip & Interfacing with Printer (any type)
9. Study of EPROM Programmer  
OR  
Study of Timer Controller Chip 8253
10. Study of PLC and Simple Program Execution using PLC (8 bit / 16 bit any one)

## **Reference Books**

1. R. S. Gaonkar Microprocessor Architecture, programming and applications with 8085, Wiley Eastern Publication.
2. A. P. Mathur Microprocessor architecture & applications, TMH.
3. Lance leventhal Programming with 8085, Mc Graw Hill.
4. "Microprocessors and Microcontrollers" Jhadhe, Thavare, Nirali Prakashan
5. Kenneth Ayala,"8051 microcontroller" PHI
6. Microprocessor Applications Douglas Hall - McGraw Hill
7. 8085 peripheral & application manual - Intel.
- 8 Microcontrollers by Mazidi
- 9 Ajay Deshmukh ,"Microcontroller Theory and application " TMH

## **Theory of Printing Machines (202291)**

### **Teaching Scheme**

Theory - 4 Hours/Week  
hrs)

Practical - 2 Hours/Week

### **Examination Scheme**

Paper - 100 Marks (4

Term Work - 50 Marks

## **SECTION I**

### **UNIT I Introduction**

Definitions of link, kinematics pair, kinematics chain, mechanism, machine, structure, inversion, degree of freedom. Inversions of four bar chain, single slider crank chain and double slider crank chain. Geneva mechanism, Ratchet and pawl arrangement, Pantograph mechanism.

### **UNIT II Velocity and Acceleration Analysis**

Importance of velocity and acceleration analysis in mechanisms, Velocity analysis of mechanisms by relative velocity method, acceleration analysis of mechanisms by relative acceleration method, velocity and acceleration image principle.

### **UNIT III Coriolis Acceleration**

Concept of Coriolis component of acceleration, direction of coriolis component of acceleration, velocity and acceleration analysis of mechanisms having Coriolis component of acceleration.

## **SECTION II**

### **UNIT IV Friction and Friction Clutches**

Dry friction, Lubrication methods, principle of hydrodynamic and hydrostatic lubrication. Pivot and collar friction. Plate clutch, cone clutch and centrifugal clutch, Torque transmitting capacity by uniform wear and uniform pressure theory, clutch operating mechanisms.

### **UNIT V Brakes**

Different types of brakes, Shoe brakes, External and Internal shoe brakes, Block brakes, Band brakes, Band and Block brakes, Braking torque.

### **UNIT VI Belt, Rope and Chain Drives**

Flat and Vee belt, Rope, Limiting tension ratio, power transmitted, centrifugal effect, maximum power transmitted by a belt, slip, creep, initial tension. Selection of belt from manufacturer's catalogue.

Chain drive classification of chain, pitch, pitch circle diameter, chain speed, angular velocity of sprocket, chain length.

### **Term Work**

Term Work shall consist of following **Eight** experiments

1. Study of inversions of one of the kinematics chains.
2. Velocity and acceleration diagrams
3. Velocity and acceleration diagrams( with coriolis component of acceleration)
4. Study of belt drive.
5. Selection procedure of belt from manufacturer's catalogue.
6. Study of clutches.
7. Study of brakes.
8. Study of chain drive.

### **Reference Books**

1. Thomas Bevan- Theory of Machines, CBS Publishers
2. J. E. Shigley- Theory of Machines and Mechanisms, McGraw Hill Publication
3. P. L. Ballaney- Theory of Machines, Khanna Publishers
4. S. S. Rattan- Theory of Machines, Tata McGraw Hill Publication.

## **Workshop Practice II (211292)**

### **Teaching Scheme**

Practical - 2 Hours/Week

### **Examination Scheme**

Term Work - 25 Marks

Oral - 25 Marks

### **Term Work:**

**Part A:** Each candidate is required perform one job in each of following;:

1. CNC Lathe
2. Welding
3. Pattern Making

**Part B:** Demonstration of following manufacturing processes: with the help of demonstration models and audio / video facilities

1. Non chip forming processes,
  - Pattern, Pattern making, molding and sand casting
  - Hot working and Cold working processes
  - Welding Processes
2. Chip forming processes
  - Lathe and its operations,
  - Milling Machines and its operations
  - Grinding Machines and its operations
  - CNC machine
  - Machining centre
3. Metrological instruments
  - Vernier Caliper
  - Micrometer
  - Height Gauge
  - Depth Gauge
  - Dial Gauge
4. Material Handling Equipments



- Cranes
- Hoists
- Fork Lifts
- AGV (Automatic Guided Vehicles)

Journal should contain the Four assignments based on above .

**Note- Oral shall be based on content of Part- B**