

## Semester II

### Subjects

Mathematics II

Design and analysis of algorithms

Electronics and Tele Communication Systems

Professional Skill Development course

Computer Graphics

CLASS: B. Sc (Information technology) Semester – II

### SUBJECT: Mathematics II

**Complex Numbers** . Cartesian, Polar & Exponential form, De-Moivre's theorem, Vector Algebra and Vector Differentiation . Product of three or more vector, Gradient, divergence & applications, Integral Calculus . Double Integral., Triple Integral Differentiation under integral sign . Error functions, Beta and Gamma functions, Properties and duplication formula.

**Fourier Series**. Orthogonal functions. Fourier series of even and odd functions. Laplace Transform . of all standard functions, Periodic function, inverse laplace transform, application of laplace transform, Complex Variables . Cauchy Riemann Equations, Mapping . Conformal Mapping & bilinear mapping, Concept of line integral, Riemann integral, Singularities . Poles, Evaluation of residues, Residue theorem

### Reference

P. N. Wartikar & J. N. Wartikar, .Elements of Applied Mathematics., 7<sup>th</sup>, Pune Vidyarthi Graha, 1988.

B. S. Grewal, .Higher Engineering Mathematics.

Shanti Narayan, .Differential Calculus., Shamalal Charitable Trust, 1997.

Murray Spiegel, .Vector Analysis., McGraw Hill, 1974

Schaum Series, Vector Analysis, Spigel

Advanced Engineering Mathematics with matlab, Thomas L Harman, James Dabney

Norman Richert Brooks/cole, Thompson Learning

### Term Work

Should contain at least 10 assignments covering the syllabus

Tutorial

Tutorial should contain 5 assignments

Practical

None

CLASS: B. Sc (Information technology) Semester - II

### SUBJECT: Designing and Analysis of Algorithms

Introduction and analysis of algorithms, Elementary data Structures. Arrays, Linked list, Stacks and Queues, Trees, Heaps and Heapsorts, Set and disjoint set union, Graphs, Hashing. Divide And Conquer General method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, Selection sort, Strassen's matrix multiplication. The Greedy Method, General method, Optimal storage on tapes, Knap sack problem, Job sequencing with deadlines, Optimal merge patterns, Minimum

spanning trees, Single source shortest path. Basic Search And Traversal Techniques The techniques of code optimization, AND/OR graphs, Game trees, Biconnected components and depth-first search. Breadth Search, Back Tracking General method of 8-queens problem, Sum of subsets, Graph coloring, Hamilton cycles, Knapsack problem.

#### Reference

Knuth 'Fundamentals of Algorithms. (Narosa Publication)  
CMA by Tanenbaum  
Kruse, Leung, Tondo, .Data structures and Program Design in C., Prentice Hall, 1991.  
Wirth, . Algorithms + Data Structures = Programmes., Prentice Hall  
Aho, Hopcroft, Ullman, .Data Structures and Algorithms., Addison-Wesley.  
Horowitz, Sahni, .Fundamentals of Data Structures, Computer Science Press.  
Fundamentals of Computer Algorithms, Ellis  
Introduction to algorithms, Thomas Corman, R Ronald, PHI  
How to solve by Computers, R. G. Bromei, PHI  
Mastering Algorithms with C, Kyle Loudon, O.Reilly  
Digital Logic, John M Yarbrough, Brooks/cole, Thompson Learning

#### Term Work

Should contain at least 10 assignments covering the syllabus

#### Tutorial

Tutorial should contain 5 assignments

#### Practical

None

CLASS: B. Sc (Information technology) **Semester - II**  
**SUBJECT: Electronics and Telecommunications Systems.**

Concept of Conductor, Semiconductor, Insulator. Semiconductor Diode, Forward bias, Reverse Bias, Application of Diode as Rectifier, Introduction to Transistor (BJT, FET), PNP, NPN Transistors their Characteristic. Introduction to Network Theorems: - KVL, KCL, Superposition, Thevenin's, Norton's.

**DC Biasing:** - Fixed Bias, Emitter Stabilized bias,

**Voltage-** Divider Bias (including problems). Concept of Q-point. Application of Transistor as Switch.

AC analysis of BJT Transistor using re model (including problems on  $A_v$ ,  $A_i$ ,  $Z_i$ ,  $Z_o$ ), Application of BJT as single stage Amplifier, Frequency response of single stage Amplifier.

**Multistage Amplifiers:-** (Basics concepts) RC coupled, cascade, Darlington pair, DC amplifiers,

**Concept of Feedback:-** Negative Feedback and its advantage in Amplification,

**Positive Feedback :-** Oscillators, Comparison between Oscillator and Amplifier, RC Phase Shift Oscillator, LC Oscillator.

**Switching Circuits Multivibrators :** - Monostable using IC 555 and Astable using IC 555 (including problems),

**Voltage Regulators:** Need of Voltage regulation, Zener diode basics (including problems on Zener diode), Series Voltage Regulation, Shunt Voltage Regulation,

**Power Amplifiers:** - Class A, B, AB. Design of Single stage Amplifier using BJT.

#### Telecommunication

**Introduction:-** Need for modulation system, Concept of Modulation.

**AM :-** Definition of AM, Modulation index, Power relation in AM, Generation and Demodulation of AM.

**SSB:-** Power requirement in comparison with AM, Advantages of SSB over AM, Concept of Balanced Modulator, Generation of SSB, Pilot Carrier System, Independent Side System, Vestigial Sideband Transmission.

**FM: -** Definition of FM, Bandwidth, Noise triangle, Pre-emphasis and De-emphasis.

**PM: -** Definition of PM. Difference between AM and FM. Radio receivers. Pulse

**Modulation:-** Sampling Theorem, PAM, PTM, PWM, PPM, pulse code modulation, Quantization noise, companding, PCM system, differential PCM, Delta modulation.

**Multiplexing: -** FDM/TDM. Television:- Scanning, Composite Video signal, Television Transmitter, television receiver.

**Introduction to Digital Communication:** PSK, ASK, FSK.

**Introduction to fiber optics system:-** Propagation of light in optical fiber; ray model .

**Types of fiber :** Single mode, step index. Graded index. Signal distortion: attenuation, dispersion. Optical sources: LED, LASERS. Optical Detectors and optics

links. Link Budget.

### **References**

Allen Mottershead, .Electronic Devices and Circuits., PHI

Boylstead and Neshelesky , .Electronics Devices and Circuits., 4<sup>th</sup> , PHI, 1999.

Simon Haykin, .An Introduction to Analog and Digital communications., John Wiley and Sons, 1994.

R.B Carlson, .Communication Systems., MacGraw Hill.

George Kennedy, .Electrical Communication systems., Tata McGraw Hill 1993.

Roody Collin, .Electronics Communication., PHI

J. Millman and A Grabel, . Microelectronics. MacGraw Hill 1988.

Proakis J. J, .Digital Communications. Mc Graw Hill.

Digital Communications by TAUB Schilling

Electronic Communication Systems, Roy BlakeDelmar, Thompson Learning

Introduction To telecommunications, Anu A Gokhale, Delmar Thompson Learning

### **4Term Work**

Should contain at least 10 assignments covering the syllabus

Tutorial

Tutorial should contain 5 assignments

Practical

Should contain 5 demonstrations / hands on, assignments covering the syllabus

CLASS: B. Sc (Information Technology) **Semester - II**

**SUBJECT: Professional Skill Development course**

i) **Effective communication** in Business, Importance and benefits of effective communication., Components of communication, The concepts and problems of communication, Non-verbal communication.

ii) **Seven C's of Effective Communication**, The Process of preparing Effective Business Messages.

iii) **The Appearance and Design of Business messages**, Business letters, Memorandums, Special time saving message media.

iv) **Persuasive Written Business**, Short Reports, Long (Formal) Reports, Strategies

for Successful Speaking and Successful Listening, Strategies for Successful Informative and Persuasive Speaking., Strategies for successful interpersonal Communication, Strategies for successful Business and Group Meetings.

v) **Activities:** Communication Games, Report writing skills, Effective communication Skills, Technical Project Report preparation

vi) **Issues of basic human Psychology and value system.**

vii) **Negotiation Skills**

### **Reference**

Communications in Organizations, Dalmar Fisher, Jaico Publishing House  
Effective Business Communications, Herta A. Murphy, Herbert W. Hildebrandt & Jane P. Thomas, McGraw Hill

Report Writing for Business, Lesikar, Raymond, Richard D. Irwin Inc.

Business Communication: Strategies and Solutions, John W. Baird & James B. Stull, McGraw Hill

Tough Choices- Managers Talk Ethics, Toffler, Allied Publishers Pvt. Ltd.

Lateral Thinking, Edward De Bono, Penguin Books

### **Term Work**

**Should contain at least 10 assignments covering the syllabus**

**Tutorial**

**Tutorial should contain 5 assignments**

**Practical**

**Industrial visits, mock GD, mock presentations / seminars**

CLASS: B. Sc (Information technology) **Semester - II**

**SUBJECT: Computer Graphics**

### **i) Graphics**

(a) **Introduction**, What is computer graphics? Elements of graphics workstation, Video Display Devices- Raster Scan Systems, Random Scan Systems, Input Devices, Graphics Software Coordinate Representations, Fundamental problems in Geometry

(b) **Algorithms: Line drawing algorithms-** DDA Algorithm, Bresenham's Line Algorithm, Frame Buffers, Circle and ellipse generating algorithms- Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Polynomials and spline curves, Filling- Filled Area Primitives, Scan-Line Polygon Fill Algorithm, Inside-Outside Tests, Scan-Line Fill of Curved Boundary Areas, Boundary-Fill Algorithm, Flood-Fill Algorithm, Character Generation, Attributes of lines, curves, filling, characters etc.

(c) **Graphics Primitives**, Primitive Operations, The Display-File Interpreter- Normalized Device Coordinates, Display-File Structure

Display-File Algorithms, Display Control, Polygons- Polygon Representation

(d) **Attributes of Output Primitives**, Line Attributes- Line Type, Line Width, Pen and Brush Options, Line Color, Color and Grayscale levels- Color Tables, Grayscale, Area-Fill Attributes- Fill Styles, Pattern Fill, Soft Fill, Character Attributes, Text Attributes

(e) **Geometric Transformations:** Matrices, Scaling Transformations- Sin and Cos Rotation, Homogeneous Coordinates and Translation, Coordinate Translations, Rotation about an arbitrary point, Inverse Transformations, Transformation Routines

(f) **Two-Dimensional Viewing**, The viewing pipeline, Viewing Coordinate Reference Frame, Window-to-viewport Coordinate Transformation, Two-Dimensional Viewing

Functions, Clipping Operations- Point Clipping, Line Clipping, Cohen-Sutherland Line Clipping, Polygon Clipping, Sutherland-Hodgeman Polygon Clipping  
(g) **Three-Dimensional Concepts:** Three-Dimensional Display Methods- Parallel

Projection, Perspective Projection, Visible Line and surface Identification, Surface Rendering, Three-Dimensional Object Representations- Bezier Curves and surfaces, B-Spline Curves and surfaces

(h) **Visibility**, Image and object precision, Z-buffer algorithm, Floating horizons

(i) **Computer Animations**, Design of Animation Sequences, General Computer Animation Functions- Raster Animations, Key-Frame Systems, Morphing, Simulating Accelerations, Motion Specifications, Kinematics and Dynamics.

### **Reference**

Computer Graphics, Donald Hearn & M. Pauline Baker, Prentice Hall of India

Computer Graphics by Hill Jr

Computer Graphics, Steven Harrington, McGraw-Hill

Computer Graphics Principles and Practice, J.D. Foley, A. Van Dam, S.K. Feiner & R.L. Phillips, Addison Wesley

Principles of Interactive Computer Graphics, Willaim M. Newman, Robert F. Sproull, McGraw-Hill.

Introduction to Computer Graphics, J.D. Foley, A. Van Dam, S.K. Feiner, J.F.

Hughes & R.L. Phillips, Addison Wesley

Computer Graphics by Rogers

**Term Work**

Should contain at least 10 assignments covering the syllabus

**Tutorial**

Tutorial should contain 5 assignments

**Practical**

Should contain 5-7 programs development in C . Programming.