SCHEME OF EXAMINATION

&

SYLLABI

for

Bachelor / Master of Technology (Dual Degree)
Information Technology

Offered by

University School of Information Technology

**GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY**

**Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi – 6 [INDIA]**
www.ipu.ac.in

Duration: 4 + 2 Years.

Applicable to:
The present scheme is being proposed for B.Tech. / M. Tech (IT) for the first eight semesters. The scheme would be effective from August – 2007. The scheme is proposed to be applicable to the batch admitted for the August – 2007 session. The scheme is also applicable from third semester onwards to the batch admitted in August – 2006.

Design Inputs
1. Gate syllabi.
2. Minimal changes in the existing course of B.Tech. (IT), but a rearrangement of the paper sequence (if required).

Comparison of the GATE Syllabus:

CSE – TOPICs	IT – TOPICs	ECE – TOPICs
1. Calculus, Linear Algebra, Probability	- do -	- do -, Transforms, ODEs, Complex Variables
2. Numerical Analysis	- do -	- do -
3. Mathematical Logic, Set Theory and Algebra, Combinatorics, Graph Theory	- do -	Networks
4. Digital Logic	- do -	Electronic Devices
5. Computer Organization and Architecture	Computer Organization	Analog Circuits
6. Programming and Data Structure, Algorithms	Programming methodology, Data Structures, Algorithms	Digital Circuits
7. Databases	- do -	Signal and Systems
8. Theory of Computation	Regular Languages, Context Free Languages	Control Systems
9. Operating Systems	- do – (in context to Unix)	Communications
10. Computer Networks	Data Comm. And CN	Electromagnetics
11. Compiler Design	Web Technologies	
12.	Information Systems and Software Engineering	

Changes proposed in the B.Tech. (IT) curriculum:

(1) Restructuring of the Data Structure paper (Semester 2).

First Semester

First Semester					
Code	Paper ID	Paper	L	T/P	Credits
Theory Papers					
HS101	98101	Communication Skills-I	2	1	3
BA103	99103	Chemistry – I	2	1	3
IT 105	15105	Introduction to Computers	3	-	3
IT 107	15107	Electrical Science	3	1	4
BA109	99109	Mathematics – I	3	1	4
BA111	99111	Physics – I	2	1	3
HS119*	98119	Impact of Science & Technology on Society – I	1	-	1
Practical/Viva Voce					
BA151	99151	Chemistry-I Lab	-	2	1
BA153	99153	Physics-I Lab	-	2	1
IT155	15155	Computer Lab	-	2	1
IT157	15157	Engineering Graphics-I	-	2	1
IT159	15159	Electrical Science Lab	-	2	1
		Total	**16**	**15**	**26**

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Second Semester

Second Semester					
Code	Paper ID	Paper	L	T/P	Credits
Theory Papers					
HS102	98102	Communication Skills – II	1	2	3
IT104	15104	Engineering Mechanics	3	1	4
BA108	99108	Mathematics – II	3	1	4
BA110	99110	Physics-II	2	1	3
BA114	99114	Statistics Theory of Probability and Linear Programming	2	1	3
BA118	99118	Chemistry-II	2	1	3
HS126*	98126	Impact of Science & Technology on Society – II	1	-	1
IT128	15128	Data Structures	3	0	3
Practical/Viva Voce					
BA156	99156	Physics –II Lab	-	2	1
BA162	99162	Chemistry –II Lab	-	2	1
IT152	15152	Data Structure Lab	-	2	1
IT154	15154	Engineering Graphics-II lab	-	2	1
		Total	**16**	**16**	**28**

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Third Semester

Third Semester					
Code	**Paper ID**	**Paper**	**L**	**T/P**	**C**
Theory Papers					
IT201	15201	Computational Methods	3	1	4
IT203	15203	Circuits and Systems	3	1	4
IT205	15205	Electronic Devices and Circuits	3	1	4
IT207	15207	Object Oriented Programming Using C++	3	1	4
IT209	15209	Computer Graphics	3	1	4
IT211	15211	Database Management Systems	3	1	4
Practical/Viva Voce					
IT251	15251	Electronic Devices and Circuits Lab.		2	1
IT253	15253	Computation Lab.		2	1
IT255	15255	Object Oriented Programming Lab.		2	1
IT257	15257	Computer Graphics Lab.		2	1
IT259	15259	DBMS Lab.		2	1
		TOTAL	**18**	**16**	**29**

Fourth Semester

Fourth Semester					
Code	**Paper ID**	**Paper**	**L**	**T/P**	**C**
Theory Papers					
IT202	15202	Java Programming	3	1	4
IT204	15204	Multimedia Applications	3	1	4
IT206	15206	Switching Theory and Logic Design	3	1	4
MS208	39208	Organization Behaviour	3	1	4
IT210	15210	Foundations of Computer Science	3	1	4
IT212	15212	Software Engineering	3	1	4
Practicals					
IT252	15252	Java Programming Lab.		2	1
IT254	15254	Multimedia Lab.		2	1
IT256	15256	Switching Theory and Logic Design Lab.		2	1
IT258	15258	Software Engineering Lab.		2	1
Total			**18**	**14**	**28**

Fifth Semester

Code	Paper ID	Paper	L	T/P	C
Fifth Semester					
Code	Paper ID	Paper	L	T/P	C
IT305	15301	Computer Architecture	3	1	4
IT307	15307	Digital Signal Processing	3	1	4
IT309	15309	Object Oriented Software Engineering	3	1	4
IT313	15313	Communication Systems	3	1	4
IT315	15315	Linux and Win32 Programming	3	1	4
IT317	15317	Operating Systems	3	1	4
Practicals					
IT353	15353	Digital Signal Processing Lab.		2	1
IT359	15359	Object Oriented Software Engineering Lab.		2	1
IT361	15361	Linux and Win32 Programming Lab.		2	1
IT357*	15357	Summer Training (Conducted at the end of the 4th Semester) Report, Seminar and Viva - Voce			1
Total			**18**	**12**	**28**

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Sixth Semester

Code	Paper ID	Paper	L	T/P	C
Sixth Semester					
Code	Paper ID	Paper	L	T/P	C
Theory Papers					
IT302	15302	Microprocessors	3	1	4
IT304	15304	Computer Networks	3	1	4
IT306	15306	Algorithm Analysis and Design	3	1	4
IT314	15314	Digital System Design	3	1	4
IT316	15316	Digital Communication	3	1	4
Practicals					
IT352	15352	Microprocessor Lab.		2	1
IT354	15354	Algorithm Analysis & Design Lab.		2	1
IT360	15360	DSD Lab.		2	1
IT362	15362	Digital Communication Lab.		2	1
Total			**15**	**13**	**24**

Seventh Semester

Seventh Semester					
Code	Paper ID	Paper	L	T/P	C
Theory Papers					
IT401	15401	Advanced Computer Networks	3	1	4
IT413	15413	Front End Design Tools and Web Technologies	3	1	4
Electives (Choose any two)					
IT403	15403	Software Testing	3	1	4
IT405	15405	Distributed Systems	3	1	4
IT415	15415	Advanced Java Programming	3	1	4
IT417	15417	Embedded System Design	3	1	4
IT419	15419	Wireless and Mobile Communication	3	1	4
IT421	15421	Data Warehousing and Mining	3	1	4
Practicals					
IT451	15451	ACN Lab.		2	1
IT453	15453	FEDT & Web Technology Lab.		2	1
IT455	15455	Laboratory work for electives		2	1
IT457	15457	Minor Project			5
IT459*	15459	Summer Training (Conducted at the end of the 6th Semester) Report, Seminar and Viva - Voce			1
Total			12	10	25

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Eighth Semester

Eighth Semester					
Code	Paper ID	Paper	L	T/P	C
HS402*	98402	Technical Writing	2		2
Electives (Choose any two)					
IT404	15404	Advanced Computer Architecture	3	1	4
IT406	15406	Control Systems	3	1	4
IT408	15408	Advanced Database Management Systems	3	1	4
IT414	15414	Windows .Net Framework and C# Programming	3	1	4
IT416	15416	Mobile Computing	3	1	4
IT418	15418	Semantic Web	3	1	4
Practicals					
IT452	15452	Major Project (Report)			8
IT454	15454	Viva – Voce (On major project)			2
IT456*	15456	Seminar and progress report			1
IT458	15458	Laboratory Assignments			1
Total			8	2	22

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Note:
1. '*' Marked papers are NUES papers.
2. Total number of credits in BTECH(IT) = 210
3. The minimum number of credits to be earned for the award of the degree is = 200

Code: HS 101   **L**   **T/P**   **C**

Paper ID: 98101   **Paper: Communication Skills – I**   **2**   **1**   **1**

I.   Remedial Grammar
- (a)   Simple sentences – their phrase structure
- (b)   Parts of speech
- (c)   Tense and concord
- (d)   Gerunds, Participles & Infinitives
- (e)   Complex and Compound sentences (Use of connectives)
- (f)   Conditional clauses
- (g)   Question tags & short responses
- (h)   Common errors

II.   Vocabulary and Usage
- (a)   Synonyms & Antonyms
- (b)   One word substitutions
- (c)   Words often confused
- (d)   Idioms / Idiomatic expressions
- (e)   Foreign Phrases (Greek and Latin)

III.   Presentation of Technical Information:
Technical description of
- (a)   Simple objects, tools, appliances
- (b)   Processes and operations
- (c)   Scientific principles

IV.   Composition:
- (a)   Comprehension – Unseen passages
- (b)   Dialogues – Creation of mock situations.
- (c)   Debates – Discussing the pros and cons of a given topic.
- (d)   Thematic Appreciation Exercises / Development of situational outlines.

V.   Prose
Selected prose pieces from prescribed texts.

1.   **Water:** Specifications for water, Analysis of water-Alkanity, hardness and its determination (EDTA Method only), water for domestic use, Water-softening-Lime-Soda process, Ion-exchanger polished water, Boiled-feed water, boiler problems-scale, sludge priming and foaming, caustic embrittlement and corrosion, their causes and prevention, removal of silice, removal of dissolved gases, carbonates phosphates conditioning, colloidal conditioning, Calgon treatment, conditioning, Numerical problems of Alkanity, hardness Lime-Soda process and EDTA method.

2.   **Fuels:** Definition and classification, combustion and chemical principles involved in it. Calorific value: Gross and Net Calorific values and their determination by Boy's Gas Calorimeter and Bomb Calorimeter.

          i)   Solid fuels: Proximate and ultimate analysis of coal and their importance.
                     Carbonization: High and Low temperature carbonization, coke, its manufacture by the Otto Hoffman Oven and uses.

          ii)   Liquid fuels: Converison of coal into liquid fuels (Bogius process & Fischer Tropsch process and mechanism, Petroleum: its chemical composition and Fractional distillation, Cracking of heavy oil residues: thermal cracking and catalytic cracking, Knocking-chemical structure and knocking: Octane and Cetane number and their significance, Power alcohol.

          iii)   Gaseous Fuels: Natural gas, producer gas, water gas, carburetted water gas, coal gas and oil gas, fuel and fuel gases and their analysis by Orsat's apparatus.

          iv)   Numerical on calorific value, combustion, Proximate and ultimate analysis of coal and fuel gas analysis.

          v)   Nuclear Fuels: Nuclear reactions, nuclear fission and nuclear fusion, Nuclear reactor.

3.   **Polymers:**   Basic concepts & Terminology, such as monomers, Polymers, functionality, Thermoplastics, Thermosets, Linear, Branched, cross linked polymers etc. Different definitions of molecular weight's viz. Mw, Mn, Mv and then determinations, Industrial applications of polymers, Addition, condensation and Ionic polymerization's solutions of polymers, good solvents, & bad solvent, solubility parameter, solutions viscosity and determination of intrinsic viscosity.

4.   **Corrosion:**   Definition and types of corrosion, Laws of oxide film 'growth (Linear, parabolic and logarithmic), different theories of corrosion, Atmospheric corrosion, Stress corrosion, water-line, pitting and soil corrosion.

Protective measures against corrosion:

          i)   Modification of environment
          ii)   Modification of the properties of the metal
          iii)   Use of protective coatings
          iv)   Cathodic Protection
          v)   Material selection and design

Code : IT105   **L   T/P   C**
Paper ID:15105   **Paper: Introduction To Computers   3   0   3**

I.   Introduction: Overview of computer organization and historical perspective computer applications in various fields of science and management.
Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions. Binary arithmetic, Floating point arithmetic, signed and unsigned numbers. Data Storage: Primary and Secondary storage, Introduction to various computer devices such as keyboard, mouse, printers, disk files, floppies etc. Concept of computing, contemporary, Operating Systems such as DOS, Windows'95, UNIX etc. (only brief user level description). Introduction to organization and architecture of mainframe, mini and micro systems. Introduction to E-mail, ftp, login and other network services, world wide web, MS-Office.

II.   Introduction to Programming: Concept of algorithms, Flow charts, Example of Algorithms such as how to add ten numbers, roots of a quadratic equation. Concept of sequentially following up the steps of a algorithm.Notion of program, programmability and programming languages, Structure of programs, Object codes, compilers.
Introduction to the Editing tools such as vi or MS-VC editors. Concepts of the finite storage, bits, bytes, kilo, mega and gigabytes, Concepts of character representation.

III.   Programming using C: The emphasis should be more on programming techniques rather that the language itself. The C programming language is being chosen mainly because of the availability of the compilers, books and other reference materials. Example of some simple C program. Dissection of the program line by line, Concepts of Variables, program statements and function calls from the library (printf for example)
- o   C data types, int, char, float etc.
- o   C expressions, arithmetic operations, relational and logic operations.
- o   C assignment statements, extension of assignment to the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions.
- o   C statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.
- o   Concepts of loops, example of loops in C using for, while and do-while, Optionally continue may be mentioned.
- o   One dimensional arrays and example of iterative programs using arrays, 2-d arrays. Use in matrix computations.
- o   Concept of Sub-programming, functions, Example of functions, Argument passing mainly for the simple variables.
- o   Pointers, relationship between arrays and pointers, Argument passing using pointers, Array of pointers, Passing arrays as arguments.
- o   Strings and C string library
     Structures and Unions. Defining C structures, passing strings as arguments, programming examples.
- o   File I/O, Use of fopen, fscanf and fprintf routines

Code: IT107   L   T/P   C
Paper ID: 15107   **Paper: Electrical Science**   3   1   4

I.   Properties of Conductors and Insulators
        Basic laws of Electrical Engineering
        Temperature Resistance Coefficients

II.   D.C. Circuits
        Network theorems and applications
        Division of Current
        Potentiometer
        Circuit Parameters
        Energy and Power
        Superposition
        Thevenin and Reciprocity theorems
        Star Delta Formations

III.   Alternating Currents
        Peak, Average and RMS values for alternating currents
        Power and Power factor
        Resistance, Inductance and Capacitance
        Resonance
        Q Factor

IV.   Electromagnetism
        Magnetic Induction
        Permeability
        Hysteresis

V.   Measuring Instruments
        Moving Coil and Moving Iron Instruments
        Construction of Instruments
        Attraction and Repulsion type
        Permanent Magnet and Eletrodynamics, Dynamometer type

VI.   D.C. Generators & Motors
        Principle of operation of Generators & Motors
        Speed Control of shunt motors
        Flux control, Rheostatic control, voltage control
        Speed control of series motors

VII.   A.C. Generators & Motors
        Principle of operation
        Removing Magnetic field
        Squirrel cage and phase wound rotor
        Starting of Induction motors
        Direct on line and Star Delta starters
        Synchronous machines

VIII.   Transformers

        Construction
        Regulation and efficiency calculations
        Open and short circuit tests

Paper Code: BA-109   **L**   **T/P**   **C**
Paper ID: 99109   **Paper : Mathematics – I**   **3**   **2**   **4**

1(a)   **Calculus of functions of One variable**

         (i)   Successive Differentiation, Leibnitz's theorem (without proof). Lagrange's Theorem, Cauchy Mean value theorems, Taylor's theorem (without proof), Remainder term, Asymptotes, Curvature, Curve Tracing.

                                                                       14 hrs

         (ii)   Infinite Series: Convergence, divergence, Comparison test, Ration Test, Cauchy n^{th} root test, Leibnitz's test (without proof), Absolute and Conditional Convergence, Taylor and Meclaurin series, Power Series, Radius of Convergence.

                                                                       5 hrs

         (iii)   Integral Calculus: Reduction Formulae of trigonometric functions, Properties of definite Integral, Applications to length, area, volume, surface of revolution, Definition of improper integrals, Beta-Gamma functions.

                                                                         8 hrs

1(b)   **Calculus of Functions of several variables:**

         Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials. Maxima, Minima and saddle points, Method of Lagrange multipliers. Differentiation under Integral sign, Jacobians and transformations of coordinates. Double and Triple integrals. Simple applications to areas, Volumes etc.

                                                                       12 hrs

II   **Vector Calculus:**

         Scalar and vector fields, Curves, Arc length, Tangent, normal, Directional Derivative, Gradient of scalar field, divergence and curl of a vector field. Line integral (independent of path), Green's theorem, Divergence theorem and Stoke's theorem (without proofs), Surface Integrals.

                                                                       12 hrs

Suggested Text Books & References

1.   G.B. Thomas and R.L. Finney, "Calculus and Analytic Geometry", 6th edition, Addison-Wesley/Narosa, 1985.
2.   Shanti Narayan, "Differential Calculus", S. Chand & Co.
3.   Shanti Narayan, "Integral Calculus", S. Chand & Co.
4.   Grewal B.S., "Higher Engineering Mathematics", Khanna Publ.
5.   E. Kreyszig, "Advanced Engineering Mathematics", 5th Edition, Wiley Eastern, 1985.
6.   Murray R. Spiegel, "Theory and Problems of Vectors Analysis", Schaum's Outline Series, Mc Graw Hill Ed.
7.   S.C. Malik, "Mathematical Analysis", Wiley Eastern Ltd.
8.   "Advanced Calculus", Schaum's Outline Series, Mc Graw Hill Ed.
9.   Widder, "Advanced Calculus", 2nd Edition, Prentice Hall Publishers.

Paper Code: BA-111   **L   T/P   C**
Paper ID: 99111   Paper: Physics – I   2   1   3

I   OPTICS
Polarization
Types of polarization, elliptically and circularly polarized light Brewsters law, Malu's law, Nicol prism, double refraction, quarter-wave and half-wave plates, optical activity, specific rotation, Laurent half shade polarimeter.

5 hrs.

Interference
Coherence and coherent sources, interference by division of wave front (young's double slit experiment, Fresnel's biprism), interference by division of amplitude (thin films, Newton's rings, Michelson's interferrometer, Fabry Perot interferrometer)

7 hrs.

Diffraction
(Fresnel and Fraunhofer types of diffraction) Fraunhofer difraction: Single slit, double slit, circular aperture and N-slit, diffraction grating wavelength determination, resolving power and dispersive power, Fresnel Diffraction: Zone plate, circular aperture, opaque circular disc, narrow slit.

7 hrs.

II   LASER AND FIBRE OPTICS
Lasers
Introduction, coherence, Einstein A and B coefficients, population inversion, basic principle and operation of a laser, type of lasers, He-Ne laser, Ruby laser, semiconductor laser, holography-theory and applications.

5 hrs.

Fibre Optics:
Introduction to optical fibre, types of optical fibres and their characteristics, (Attenuation and dispersion step index and graded index fibres, principle of fibre optic communication-total internal reflection, numerical aperture, fibre optical communication network (qualitative)-its advantages.

5 hrs.

III   Theory of relativity
Absolute and Inertial frames of reference, Galenlian transformations, Michelson-Morley experiment, the postulates of the special theory of relativity, Lorentz transformations, time dilation, length contraction, velocity addition, mass energy equivalence.

5 hrs.

Recommended Books
1.   Concepts of Modern Physics: A. Beiser
2.   Modern Physics: Kenneth Krane
3.   Fundaments of Optics: Jenkins and White
4.   Optics: Ghatak
5.   Fundamental of Physics by RESNICK & HALLIDAY

Practicals:

Code: BA151		**L**	**T/P**	**C**
Paper ID:99151	**Paper: Chemistry – I Lab.**	**0**	**2**	**1**

Practicals based on BA103.

Code: BA153		**L**	**T/P**	**C**
Paper ID:99153	**Paper: Physics– I Lab.**	**0**	**2**	**1**

Practicals based on BA109.

Code: IT155		**L**	**T/P**	**C**
Paper ID:15155	**Paper: Computer Lab.**	**0**	**2**	**1**

Practicals based on IT105.

Code: IT157		**L**	**T/P**	**C**
Paper ID:15157	**Paper: Engineering Graphics –I**	**0**	**2**	**1**

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

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

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

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

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

6. Development of Surface
    Development of simple objects with and without sectioning.

7. Nomography
    Basic concepts and use.

Code: IT159   **L   T/P   C**
Paper ID:15159   **Paper: Electrical Science Lab.**   **0   2   1**

Practicals based on IT107.

Code: HS102   **L**   **T/P**   **C**
Paper ID:98102   **Paper: Communication Skills – II**   **1**   **2**   **3**

1. Some Key Concepts:
   Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.

2. Writing:
   Selecting material for expository, descriptive, and argumentative pieces; business letters; formal report; summarizing and abstracting; expressing ideas within a restricted word limit; paragraph division, introduction and the conclusion; listing reference material; use of charts, graphs and tables; punctuation and spelling; semantics of connectives, modifiers and modals, variety in sentences and paragraphs.

3. Reading Comprehension:
   Reading at various speeds (slow, fast, very fast), reading different kinds of texts for different purposes (e.g., for relaxation, for information, for discussion at a later stage, etc.); reading between the lines.

4. Speaking:
   Achieving desired clarity and fluency; manipulating paralinguistic features of speaking (voice quality, pitch, tone, etc.); pausing for effectiveness while speaking, task-oriented, interpersonal, informal and semiformal speaking; making a short classroom presentation.

5. Group Discussion:
   Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; being polite and firm; handling questions and taking in criticism of self; turn-taking strategies and effective intervention; use of body language).

6. Listening Comprehension:
   Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English and American English, intelligent listening in situations such as an interview in which one is a candidate.

Code: IT104   **L**   **T/P**   **C**
Paper ID:15104   **Paper: Engineering Mechanics**   **3**   **1**   **4**

1.   Force System: Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line. Varigon's theorem, couple, resolution of force into force and a couple, properties of couple and their application to engineering problems.

2.   Equilibrium: Force body diagram, equations of equilibrium and their applications to engineering problems, equilibrium of two force and three force member

3.   Structure: Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section and graphical method.

4.   Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, frictional lock, friction of flat pivot and collered thrust bearings, friction in journal-bearing, friction in screws, derivation of equation.

$$T_1 / T_2 \qquad = \qquad \lambda_e\,A \qquad\qquad \text{and its application.}$$

5.   Distributed Forces: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertial., Dynamics.

6.   Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular co-ordinates, normal and tangential coordinates

7.   Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

8.   Kinematics of Rigid Bodies: Concept of rigid body, types of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Corioli's component excluded) and instantaneous center of zero velocity, Velocity and acceleration polygons for four bar mechanism and single slider mechanism.

9.   Kinetics of Rigid Bodies: Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

10.   Vibrations: Classification, torsional free vibrations-single rotor and two rotor system, Spring mass system-its damped (linear dash pot) and undamped free vibrations, spring in series and parallel, simple problems.

Text/Reference:
1.   U.C.   Jindal,   "Engineering   Mechanics",   Galgotia   Publication.2000.

Code No.: BA108   **L**   **T/P**   **C**
Paper ID:99108   **Paper: Mathematics-II**   **3**   **1**   **4**

1.   Linear Algebra: Vector spaces – linear independence and dependence of vectors, inner
        products, Inner product spaces, Matrices and determinants, Linear transformations, Systems of
        linear equations- consistency and inconsistency, Gauss elimination, rank of a matrix, inverse
        of a matrix, Bilinear, Quadratic, Hermitian, Skew-Hermitian Forms, Eigenvalues and
        Eigenvectors of a matrix, diagonalization of a matrix, Cayley-Hamilton Theorem (without
        proof).

2.   Ordinary Differential Equations: Formation of ODE's, definition of order, degree and
        solutions. ODE's of first order: Method of separation of variables, homogeneous and
        nonhomogeneous equations, exactness and integrating factors, linear equations and Bernoulli
        equations, General linear ODE's of nth order: solutions of homogeneous and nonhomogenous
        equations, operator method, method of undermined coefficients and variation of parameters,
        Solutions of simple simultaneous ODE's. Power series method of solution of DE, Legendre's
        Equation, Legendre's Polynomials, Bessel's equation, Bessel's function.

3.   Complex Variables: Curves and Regions in the Complex Plane, Complex Functions, Limits,
        Derivative, Analytic Function, Cauchy-Riemann Equations, Laplace's Equation, Rational,
        Exponential, Trigonometric, Hyperbolic Functions, Linear Fractional Transformations,
        Conformal Mapping, Complex Line Integral, Cauchy's Integral Theorem, Cauchy's Integral
        Formula, Derivatives of Analytic Function, Power Series, Taylor Series, Laurent Series,
        Methods of obtaining Power Series, Analyticity at Infinity, Zeroes, Singularities, Residues,
        Residue Theorem, Evaluation of Real Integrals.

4.   Probability and Statistics: Random Variables, Discrete and Continuous Distribution, Mean
        and Variance of a Distribution, Moments, Moment Generating Functions, Skewness, Kurtosis,
        Binomial, Poisson, Normal Distributions, Testing of Statistical Hypothesis, F-Test, T-test, χ^2-
        test.

Code: BA110   **L**   **T/P**   **C**
Paper ID:99110   **Paper: Physics – II**   **2**   **1**   **3**

I.   **Quantum Mechanics:**
Wave particle duality, deBroglie waves, evidences for the wave nature of matter – the experiment of Davisson and Germer, electron diffraction, physical interpretation of the wave function and its properties, the wave packet, the uncertainty principle.

4 hrs.

The Schrodinger wave equation (1-dimensional), Eigen values and Eigen functions, expectation values, simple Eigen value problems – solutions of the Schrodinger's equations for the free particle, the infinite well, the finite well, tunneling effect, simple harmonic oscillator (qualitative), zero point energy.

6 hrs.

II.   **Quantum Statistics**
The statistical distributors: Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac statistics, their comparisons, Fermions and Bosons Applications: Molecular speed and energies in an ideal gas, The Black body spectrum, the failure of classical to give the correct explanations – the applications of Bose-Einstein statistics to the Black body radiation spectrum, Fermi-Dirac distribution, free electron theory, electronic specific heats, Fermi energy and average energy – its significance.

10 hrs.

III.   **Band Theory of Solids**
Origin of energy bands in solids, motion of electrons in a periodic potential – the Kronig – Penny model, Brillouin zones, effective mass, metals, semi-conductors and insulators and their energy band structures, Extrinsic and Intrinsic semiconductors, doping-fermi energy for doped and undoped semiconductors, the p-n junction (energy band diagrams with fermi energy), the unbiased diode, forward and reverse biased diodes –tunnel diodes, zener diode, photo diode its characteristics, LED, Introduction to transistors.

10 hrs.

IV.   **Overview of Electro-Magnetism**
Maxwell's Equations: The equation of continuity for Time-Varying fields, Inconsistency in ampere's law, Maxwell's Equations, conditions at a Boundary Surface, Introduction to EM wave.

4 hrs.

Recommended Books:
1.   Concept of Modern Physics: A Beiser
2.   Modern Physics: Kenneth Krane
3.   Solid State Physics: Kittle
4.   Electronic Principles: Malvino
5.   Statistical Mechanics: Garg Bansal and Ghosh (TMH)

Code: BA 114		**L**	**T/P**	**C**
Paper ID: 99114	**Paper: Statistics, Theory Of Probability**	**2**	**1**	**3**
	And Linear Programming			

1. PROBABILITY, STATISTICS

Elementary Probability theory, Random Variables: discrete and continuous, distribution and density functions, Expectation, Moments, Moment Generating function, Skewness, Kurtosis, Binomial, Poisson and Normal distribution, Method of least square for linear and parabolic curves, Correlation of a bivariate distribution, Linear regression, properties of regression coefficient, Sampling distribution of mean and variance, Testing of Statistical hypothesis, F-test, T-test and chi square test.

17 hrs.

2. LINEAR PROGRAMMING

Mathematical Preliminaries, Formulation of the Problem and Solution by Graphical method, The simplex Method, Dual problem formulation and Solution, Application to Transportation and Assignment Problems.

17 hrs.

Suggested Text Books & References

1. Irwin Miller and John E. Freund, "Probability and Statistics for Engineers" PHI
2. Spiegel, "Probability and Statistics", Schaum Series
3. S. C. Gupta and V. K. Kapur, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons.
4. Kambo N. S., "Mathematical Programming Techniques", McGraw Hill
5. Handley, "Linear Programming", Narosa Publications.

Code: BA118   **L**   **T/P**   **C**
Paper ID:99118   **Paper: Chemistry – II**   **2**   **1**   **3**

1.   Atomic Structure: Introduction to wave mechanics, the Schrodinger equation as applied to hydrogen atom, origin of quantum numbers Long form of periodic table on the basis of Electronic configuration s, p, d, f block elements periodic trends, Ionisation potential, atomic and ionic radii electron affinity & electro-negativity.

2.   Chemical Bonding: Ionic bond; energy changes, lattice energy Born Haber Cycle, Covalent bond-energy changes, Potential energy curve for H_2 molecule, characteristics of covalent compound, co-ordinate bond- Werner's Theory, effective atomic numbers, isomerism in coordinate compounds. Hydrogen bonding, Vander Waal's forces, hybridization and resonance, Valance Shell Electron Repulsion theory (VSEPR), Discussion of structures of H_2O, NH_3, BrF_3, SiF_4, Molecular orbital theory, Linear combination of atomic orbitals (LCAO) method. Structure of simple homo nuclear diatomic molecule like H_2, N_2, O_2, F_2.

3.   Thermochemistry: Hess's Law, heat of a reaction, effect of temperature on heat of reaction, at constant pressure (Kirchoff's Equation) heat of dilution, heat of hydration, heat of neutralization and heat of combustion, Flame temperature.

4.   Reaction Kinetics: Significance of rate law and rate equations, order and molecularity, Determinations of order of simple reactions-experimental method, Equilibrium constant and reaction rates-Lindemann, collision and activated complex theories, complex reactions of 1st order characteristics of consecutive, reversible and parallel reactions-Steady state and non-steady state approach.

5.   Electron Chemistry: Conductance of electrolytic solutions transference number and its determination, Kohlrausch's law of in-dependent migration of ions, Interionic attraction theory, activity and activity coefficient of strong electrolytes.

6.   Catalysis: Criteria for Catalysis – Homogeneous Catalysis, acid-base, Enzymatic catalysis, Catalysis by metal salts, Heterogeneous catalysis – concepts of promoters, inhibitors and poisoning, Physiosorption, Chemisorption, Surface area, Industrially important process. Theories of Catalysis.

7.   Phase rule: Derivations of phase rule, Significance of various terms involved in the definitions phase diagram of one component system partial miscibility, interpolations of two component system diagrams.

Code No.: IT 128		L	T/P	C
PaperID: 15128	Paper: Data Structures	3	0	3

Unit – 1:
 Introduction to programming methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

Unit – 2:
Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expreession trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

Unit – 3:
Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B* and B+ Trees. Graphs, Graph representation, Graph Traversal.

Unit – 4:
Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

Text:
[1]   R. F. Gilberg, and B. A. Forouzan, "Data structures: A Pseudocode approach
        with C", Thomson Learning.
[2]   A .V. Aho, J . E . Hopcroft, J . D . Ulman "Data Structures and Algorithm", Pearson
        Education.

Reference
[2]   S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications.
[3]   Tanenbaum: "Data Structures using C", Pearson/PHI.
[4]   T .H . Cormen, C . E . Leiserson, R .L . Rivest "Introduction to Algorithms", PHI/Pearson.
[5]   V . Manber "Introduction to Algorithms – A Creative Approach", Pearson Education.
[6]   Ellis Horowitz and Sartaj Sahni "Fundamentals of Computer Algorithms", Computer
        Science Press.

Practicals:

Code: BA156		L	T/P	C
Paper ID:99156	Paper: Physics– II Lab.	0	2	1

Practicals based on BA110.

Code: BA162		L	T/P	C
Paper ID:99162	Paper: Chemistry– II Lab.	0	2	1

Practicals based on BA118.

Code: IT152		L	T/P	C
Paper ID:15152	Paper: Data Structure Lab.	0	2	1

Practicals based on IT128.

Code: IT154		L	T/P	C
Paper ID:15154	Paper: Engineering Graphics Lab.	0	2	1

Basic Concepts

    I. S. drawing conventions, line symbols, kinds of line, drawing sheet lay-out, rules of printing, preferred scales.

2.   Projections

Perspective, orthographic, isometric and oblique projections, isometric scale, isometric drawing, Technical sketching.

3.   Shape Description (External)

Multiplanar representation in first- and third angle systems of projections, glass-box concept, sketching of orthographic views from pictorial views, precedence of lines.

Sketching of pictorial (isometric and oblique) views from Multiplanar orthographic views, Reading exercises, Missing line and missing view exercises.

4.   Shape Description (Internal)

Importance of sectioning, principles of sectioning, types of sections, cutting plane representation, section lines, conventional practices.

5.   Size Description

Dimensioning, tools of dimensioning, Size and location dimensions, Principles of conventions of dimensioning, Dimensioning exercises.

6.   Computer Aided Drafting

Basic concepts and use.

Paper ID: 15201   L   T/P   C
Paper Code: IT201   **Paper: Computational Methods**   3   1   4

Unit – 1:
Errors in computation, Review of Taylor Series, Mean Value Theorem. Representation of numbers (integers and Floating Point). Loss of Significance in Computation.

Location of Roots of functions and their minimization: Bisection method (convergence analysis and implementation), Newton Method (convergence analysis and implementation), Secant Method (convergence analysis and implementation). Unconstrained one variable function minimization by Fibonnaci search, Golden Section Search and Newton's method. Multivariate function minimization by the method of steepest descent, Nelder- Mead Algorithm.

Unit – 2:
Interpolation and Numerical Differentiation: Interpolating Polynomial, Lagrange Form, Newton Form, Nested Form, Inverse Interpolation, Neville's Algorithm, Errors in interpolation, Estimating Derivatives and Richardson Extrapolation.

Numerical Integration: Definite Integral, Riemann – Integrable Functions, Traezoid Rule, Romberg Algorithm, Simpson's Scheme, Gaussian Quadrature Rule.

Unit – 3:
Linear System of Equations: Conditioning, Gauss Elimination, Pivoting, Cholesky Factorization, Iterative Methods, Power Method

Approximation by Spline Function: 1st and 2nd Degree Splines, Natural Cubic Splines, B Splines, Interpolation and Approximation.

Unit – 4:
Differential Equations: Euler method, Taylor series method of higher orders, Rubge – Kutta method of order 2 and 4, Runge – Kutta – Fehlberg method, Adas – Bashforth – Moulton Formula. Solution of Parabolic, Hyperbolic and Elliptic PDEs.

Implementation to be done in C/C++.

Text:
[1]   D. Kincaid and W. Cheney, "Numerical Analysis: Mathematics of Scientific Computing", Thomson/Brooks-Cole., 2001.
Reference:
[2]   D. Kincaid and W. Cheney, "Numerical Analysis", Thomson/Brooks-Cole., 2002.
[3]   R. L. Burden and J. D. Faires, "Numerical Analysis", Thomson/Brooks-Cole, 2001.
[4]   W. Y. Yang, W. Cao, T.-S. Chung and J. Morris, "Applied Numerical Methods   Using Matlab", Wiley, 2005.
[5]   J. H. Mathews and K. D. Fink, "Numerical Methods Using Matlab", Printice Hall, 1999.
[6]   S. D. Conte and C. de Boor, "Elementary Numerical Analysis: An Algorithmic Approach", McGraw Hill, 1980.
[7]   J. D. Hoffman, "Numerical Methods for Engineers and Scientists", Marcel Dekker Inc., 2001.
[8]   J. Stoer and R. Bulirsch, "Introduction to Numerical Analysis", Springer – Verlag, 1993.
[9]   W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery, "Numerical Recipes in C", CUP, 2002.
[10]   W. Boehm and H. Prautzch, "Numerical Methods", Universities Press, 2005.
[11]   C. F. Gerald, and P. O. Wheatly, "Applied Numerical Analysis", Pearson, 1994
[12]   H. M. Antia, "Numerical Methods for Scientists & Engineers", Hindustan Book Agency, 2002.

Paper ID: 15203   **L   T/P   C**
Paper Code: IT203   **Paper: Circuits and Systems**   **3   1   4**

Unit – 1:
Review of complex variables: Complex Numbers, Algebra of Complex Numbers, Functions of Complex Variable, Taylor and Laurant Series, Differentiation, Integration, Cauchy Theorem, Residue Theorem.

Unit – 2:
Signals, Classification of Signals, Systems, Classification of Systems, Linear Time Invariant (LTI) Systems; Laplace Transform, z-Transform, Fourier Series and Transform (Continuous and Discrete) and their properties. Laplace Transform and Continuous Time LTI systems, z-Transform and Discrete Time LTI systems, Fourier analysis of signals and systems, State Space Analysis.

Unit – 3:
Circuits: Voltage, Ideal Voltage Source, Current Ideal Current Sources, Classification of Circuits, Ohm's Law, Resistively, Temperature Effect, Resistors, Resistor Power Absorption, Nominal Values and Tolerances, Colour Codes, Open and Short Circuits, Internal Resistance.

DC Circuits: Series and Parallel Circuits, Kirchhoff's Voltage and Current Law, Mesh Analysis, Loop Analysis, Nodal Analysis, Thevenin's and Norton's Theorem, Maximum Power Transfer Theorem, Superposition Theorem, Millman's Theorem, Y - Δ and Δ- Y Transformation, Bridge Circuits.

Unit – 4:
AC Circuits: Circuits containing Capacitors and Inductors, Transient Response, Alternating Current and Voltages, Phasors, Impedences and Admittance, Mesh Analysis, Loop Analysis, Nodal Analysis, Thevenin's and Norton's Theorem, Y - Δ and Δ- Y Transformation, Bridge Circuits. Resonant Circuits, Complex Frequency and Network Function, Two port Networks. Passive Filters.

Text:
[1]   B. P. Lathi, "Signal Processing and Linear System", Berkeley Cambridge Press, 1998.
[2]   A. H. Robbins and W. C. Miller, "Circuit Analysis: Theory and Practice", Thomson Learning/Delmar Pub., 2007.
[3]   A. B. Carlson, "Circuits", Thomson/Brooks-Cole, 2000.

Reference:
[4]   S. Haykin and B. V. Veen, "Signal and Systems", John Wiley and Sons, 1999.
[5]   H. P. Hsu, "Schaum's Outlines of The Theory and Problems of Signals and Systems", McGraw-Hill, 1995.
[6]   S. Madhu, "Linear Circuit Analysis", Prentice Hall, 1988.
[7]   S. Ghosh, "Signals and Systems", Pearson Education, 2006.
[8]   S. Poornachandra, "Signal and Systems", Thomson Learning, 2004.
[9]   M. Nahvi and J. A. Edminister, "Schaum's Outline of Theory and Problems of Electric Circuits", McGraw-Hill, 2003.

Paper ID: 15205   **L**   **T/P**   **C**
Code No: IT205   **Paper : Electronic Devices & Circuits**   **3**   **1**   **4**

UNIT – 1:
Semiconductor diodes and their applications
Construction, characteristics and working principles of semi conductor diodes: PN junction diode, zener diode, varactor diode, schottky diode, photo diodes, Light emitting diode, Laser diode.

UNIT – 2:
Transistors and Biasing
Construction, operation of NPN & PNP transistor, characteristics, Types of configurations, methods of transistor biasing and stabilization.

UNIT – 3:
Field Effect Transistor
Classification of FET's, construction & working principles of JFET, MOSFET, biasing methods, small signal model parameters.

UNIT – 4:
Linear Integrated Circuits
Differential amplifier circuits, operational amplifiers and its applications,

Oscillators
Concept of Feedback, barkhausen criteria for sinusoidal oscillators, phase shift oscillators, wein bridge & crystal oscillator.

Text/References:
1.   B. P. Singh and R. Singh, Electronic Devices & Integrated Circuits, Pearson, 2006.
2.   B. Kumar and S. J. Jain, Electronic Devices and Circuits, "Prntice Hall of India, 2007.
3.   Boylestad, "Electronic Devices and Circuit Theory", 9th Ed.
4.   S.G. Burns, P.R. Bond, "Principles of Electronic Circuits, 2nd Ed., Galgotia
5.   M.S. Roden, G.L. Carpenter & W.R.Wieseraman, "Electronic Design", Shroff Publisher & Distributors.
6.   B. G. Streetman, Theory & Technology & Semiconductor Devices.
7.   Millman & Halkias Electronic Devices & Circuits, TMH(ISE)
8.   S. Salivahanan & other, Electronic Devices & Circuits, TMH.
9.   Malvino, Electronic Principles, TMH.
10.   Jacob Millman, Micro Electronics, TMH.

PaperID:15207   **L**   **T/P**   **C**
Code: IT207   **Paper: Object Oriented Programming**   **3**   **1**   **4**
                                      using C++

Unit – 1:
Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism).
 Review of C, difference between C and C++, cin, cout, new, delete operators.

Unit – 2:
Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration, state identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, metaclass/abstract classes.

Unit – 3:
Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

Unit – 4:
Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

Text:
1.   S. B. Lippman & J. Lajoie, "C++ Primer", 3rd Edition, Addison Wesley, 2000.
2.   A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH

References:
1.   Rumbaugh et. al. " Object Oriented Modelling & Design", Prentice Hall
2.   G . Booch "Object Oriented Design & Applications", Benjamin,Cummings.
3.   E.Balaguruswamy, "Objected Oriented Programming with C++", TMH
4.   R. Lafore, "Object Oriented Programming using C++", Galgotia.
5.   D . Parasons, "Object Oriented Programming with C++",BPB Publication.
6.   Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.

PaperID: 15209   **L   T/P   C**
Code: IT209   **Paper : Computer Graphics**   **3   1   4**

Unit – 1:
Basic raster graphics algorithms for drawing 2 D Primitives liner, circles, ellipses, arcs, clipping, clipping circles, ellipses & polygon.

Unit – 2:
Polygon Meshes in 3D, curves, cubic & surfaces, Solid modeling.Geometric Transformation: 2D, 3D transformations, window to viewport transformations, acromatic and color models.
Graphics Hardware: Hardcopy & display techniques, Input devices, image scanners

Unit – 3:
Shading Tech: Transparency, Shadows, Object reflection, Gouraud & Phong shading techniques. Visible surface determination techniques for visible line determination, Z-buffer algorithm, scanline algorithm, algorithm for oct-tres, algorithm for curve surfaces, visible surfaces ray-tracing, recursive ray tracing, radio-city methods.

Unit – 4:
Elementary filtering tech, elementary Image Processing techniques, Geometric & multi-pass transformation mechanisms for image storage & retrieval. Procedural models, fractals, grammar-based models, multi-particle system, volume rendering.

Text:
1.   Foley et. al., "Computer Graphics Principles & practice", Addison Wesley Ltd., 2003.

References:
1.   R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
2.   D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 2003.
3.   W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
4.   R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 2001.
5.   F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.
6.   D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", MacGraw-Hill International Edition, 1989.
7.   David F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill Book Company, 1985.
8.   Alan Watt and Mark Watt, "Advanced Animation and Rendering Techniques", Addison-Wesley, 2002.

Paper ID: 15211   **L   T/P   C**
Code: IT211   **Paper: Data Base Management Systems   3   1   4**

Unit – 1:
Basic concepts: database & database users, characteristics of the database, database systems, concepts and architecture, date models, schemas & instances, DBMS architecture & data independence, database languages & interfaces, data modelling using the entity-relationship approach. Overview of hierarchical, Network & Relational Data Base Management Systems.

Relational model, languages & systems: relational data model & relational algebra: relational model concepts, relational model constraints, relational algebra, SQL- a relational database language: date definition in SQL, view and queries in SQL, specifying constraints and indexes in sql.

Unit – 2:
Oracle Architecture, Logical Data Structures Physical Data Structure, Instances, Table Spaces, Types of Tablespaces, Internal Memory Structure, Background Processes, Data Types, Roles & Privileges, Stored Procedures, User Defined Functions, Cursors, Error Handling, Triggers.

Unit – 3:
Relational data base design: function dependencies & normalization for relational dataases: functional dependencies, normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF), lossless join and dependency preserving decomposition (4NF, 5NF), domain key normal form.

Unit – 4:
Concurrency control & recovery techniques: concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures.

Concepts of object oriented database management systems, Distributed Data Base Management Systems.

Text:
1.   Elmsari and Navathe, "Fundamentals of database systems", Pearson Education

References:
2.   Date, C. J., "An introduction to database systems", 8th Edition, Pearson Education.
3.   P. Rob & C. Coronel, "Database Systems: Design Implementation & Management", Thomson Learning, 2004
4.   Date, C. J., "An introduction to database systems", 3rd Edition, Narosa   publishing house.
5.   A. V. Silberschatz, H. F. Korth and S. Sudershan, "Database System Concept", McGraw Hill, 2005.
6.   Ullman, J. D., "Principals of database systems", Galgotia publications.
7.   Desai, B., "An introduction to database concepts", Galgotia publications.

Practicals:

			L	T/P	C
Code: IT251			**L**	**T/P**	**C**
Paper ID:15251	**Paper: Electronic Devices and Circuits Lab.**		**0**	**2**	**1**

Practicals based on IT205.

			L	T/P	C
Code: IT253			**L**	**T/P**	**C**
Paper ID:15253	**Paper: Computation Lab.**		**0**	**2**	**1**

Practicals based on IT201.

			L	T/P	C
Code: IT255			**L**	**T/P**	**C**
Paper ID:15255	**Paper: Object Oriented Programming Lab.**		**0**	**2**	**1**

Practicals based on IT207.

			L	T/P	C
Code: IT257			**L**	**T/P**	**C**
Paper ID:15257	**Paper: Computer Graphics Lab.**		**0**	**2**	**1**

Practicals based on IT207.

			L	T/P	C
Code: IT259			**L**	**T/P**	**C**
Paper ID:15259	**Paper: DBMS Lab.**		**0**	**2**	**1**

Practicals based on IT211.

Paper ID: 15202   **L**   **T/P**   **C**
Code: IT202   **Paper : Java Programming**   **3**   **1**   **4**

Unit 1:
Overview and characteristics of Java, Java program Compilation and Execution Process Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

Unit 2:
Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays,Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions , The StringBuffer Class ,tokenizer,applets, Life cycle of applet and Security concerns

Unit 3:
Threads: Creating Threads, Thread Priority,Blocked States, Extending Thread Class, Runnable Interface, Starting Threads,Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

 AWT Components, Component Class, Container Class, LayoutManager Interface Default Layouts, Insets and Dimensions, BorderLayout, FlowLayout, GridLayout, CardLayout GridBagLayout AWT Events, Event Models, Listeners,Class Listener,Adapters, ActionEvent Methods FocusEvent KeyEvent,Mouse Events,WindowEvent

Unit 4:
Input/OutputStream, Stream Filters,Buffered Streams,Data input and OutputStream, PrintStream RandomAccessFile, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.
Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators .

Text/References
1.   "Java-2 the complete Reference" by Patrick Naughton and Herbertz Schidt.
2.   Head first Java,Sierra & bates , O'reilly
3.   "Programming with Java" by E Balaguruswamy.
4.   Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.
5.   Decker & Hirshfield, "Programming.Java", Vikas Publication.

Paper ID: 15204　　　　　　　　　　　　　　　　　　　　　**L**　　**T/P**　　**C**
Code: IT204　　　　　　**Paper　: Multimedia Applications**　　**3**　　**1**　　**4**

Unit - 1
Concept of Multimedia ,Media & data stream, main properties of multimedia system ,
Data stream characteristics &for continuous media Multimedia Applications, Hardware Software requirements, Storage Technologies: RAID, Optical Media.

Unit - 2
Text, Basic sound concepts , MIDI , Speech ,Basic concept of Images, Graphics format ,Basic concepts of Video & animation, Conventional system,Computer based animation, Authoring Tools, Categories of Authoring Tools.

Unit - 3
Lossless and Lossy compression, Run length coding, Statistical Coding, Transform Coding, JPEG, MPEG, Text compression using static Huffmann   technique, Dynamic Huffmann Technique, Arithmetic Technique.

Introduction, Basic Terminology techniques, tweaning & morphing, Motion Graphics 2D & 3D animation.

Unit - 4
Introduction to MAYA(Animating Tool):
 Fundamentals, Modeling: NURBS, Polygon, Organic,
Animation:Key frame animation,reactive animation,path animation,Skelton animationetc., deformers..
Dynamics: soft bodies, Rigid bodies and its usages in the scene etc.,
Rendering: soft,Hard renering. IPR rendering, Line and box rendering etc.,
Special Effects: Shading & Texturing Surfaces, Lighting, Special effects.
Working with MEL: Basics & Programming

Text Books:
1.　　　　David Hillman, "Multimedia Technology & Applications", Galgotia Publications.
2.　　　　Steinmetz "Multimedia Computing Communication and Application" Pearson Edn.
3.　　　　Andleigh and Thakarar "Multimedia System Design" PHI

Reference
1.　　　　Nigel Chapman & Jenny Chapman, "Digital Multimedia", Wiley Publications.
2.　　　　D.P. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.
3.　　　　Maya manuals.

Paper ID: 15206   **L   T/P   C**
Code: IT206   Paper   : Switching Theory and Logic Design   3   1   4

Unit – 1:
Analog & Digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra.

Standard representation of Logical functions, K-map representation and simplification of logical functions, Quinn-McClusky's Algorithm, Don't care conditions, X-OR & X-NOR simplification of K-maps.

Unit – 2:
Combinational circuits: Multiplexers, demultiplexers, Decoders & Encoders, Adders & Subtractors, Code Converters, comparators, decoder/drivers for display devices

Flip Flops: S-R, J-K, D & T Flip-flops, excitation table of a flip-flop, race around condition.

Unit – 3:
Sequential circuits: Shift registers, Ripple counter, Design of Synchronous counters and sequence detectors.

555 Timer and its application as mono-stable and astable multi-vibrator. Nyquist Sampling Theorem, A/D and D/A converters : Binary-weighted DAC, R-2R Ladder type networks, Successive-approximation ADC, Linear-ramp ADC, Dual-slope ADC

Unit – 4:
Bipolar-Transistor Characeristics, RTL and DTL circuits, TTL, ECL and C MOS Logic families.

Logic Implementations using ROM, PAL & PLA., Semiconductor Memories: Memory organization & operation, classification and characteristics of memories, RAM, ROM and content addressable memory.

Text/References:

1.   R.P. Jain, "Modern Digital Electronics", TMH, 2nd Ed,
2.   Malvino and Leach, "Digital principles and applications", TMH
3.   Morris Mano, "Digital Design", PHI, 2nd Ed.
4.   R. J. Tocci, "Digital Systems", PHI, 2000
5.   I. J. Nagrath, "Electronics, Analog & Digital", PHI, 1999.
6.   J. M. Yarbrough, "Digital Logic-Application and Design", PWS Publishing.
7.   B. S. Nai, " Digital Electronics and Logic Design", PHI
8.   Balabanian and Carlson, "Digital Logic Design Principles", Wiley Pub.

Paper ID: 15208 L T/P C
Code: MS208 **Paper : Organization Behaviour** 3 1 4

Introduction: Meaning and nature of management; management systems and processes, Tasks and responsibilities of a professional manager; Managerial skills.

Organization Structure and Process: Organizational climate and culture, Management ethos; Organizational Structure and Design: Managerial Communication; Planning process; Controlling.

Behavioural Dynamics: Individual detgerminants of Organization Behaviour; Perceptions, Learning, Personality, Attitudes and Values, Motivation; Stress and its management.

Interactive Aspects of Organizational Behaviour; Analysing inter-personal relations; Group Dynamics; Management of Organizational Conflicts; Leadership Styles.

Decision Making: Organizational Context of Decisions, Decision Making Models; Problem Solving and Decision Making.

References:
1. Luthans Fred., "Organizational Behaviour", McGraw Hill, 1998.
2. Robbins (4th ed.), "Essentials of organizational behaviour", Prentice Hall of India Pvt. Ltd., New Delhi, 1995.
3. Hersey and Blanchard (6th ed.), "Management of organizational behaviour: utilising human resources", Prentice Hall of India Pvt. Ltd., New Delhi, 1996.
4. Dwivedi, R. S., "Human relations and organizational behaviour: a global perspective", Macmillan India Ltd., Delhi, 1995.
5. Arnold, John, Robertson, Ivan t. and Cooper, Cary, l., "Work psychology: understanding human behaviour in the workplace", Macmillan India Ltd., Delhi, 1996.

Paper ID: 15210   **L   T/P   C**
Code: IT210   **Paper   : Foundations of Computer Science   3   1   4**

Unit – 1:
Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicates and validity, Normal forms. Propositional Logic, Predicate Logic. Direct Proof, Proof by Contraposition, Proof by exhausting cases and proof by contradiction.

Sets, Subsets, powersets, binary and unary operations on a set, set operations/set identities, fundamental counting principles, principle of inclusion and exclusion, pigeonhole principle, permutation and combination, pascal's triangles, binominal theorem. Relation, properties of binary relation, closures, partial ordering, equivalence relation, properties of function, composition of function, inverse, Permutation function, composition of cycles. Discrete Function Counting Theorem.

Unit – 2:
Lattices: definition, sublattices, direct product, homomorphism, definition of Boolean algebra, properties, isomorphic structures (in particulars, structures with binary operations) subalgebra, direct product and homo-morphism, Boolean function, Boolean expression, representation & minimization of Boolean function.

Principle of Well Ordering, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients, Analysis of Algorithms involving recurrence relations – comparison based sorting and searching algorithms, solution method for a divide-and-conquer recurrence relation. Growth of Functions, Masters theorem.

Unit – 3:
GCD, LCM, Fundamental Theorem of Arithmetic, primes, Congruences, Euler ϕ function, Fermat's Little Theorem, Euler's Generalization of FLT, Wilson's Theorem, The functions τ and σ, Mobius μ function, Arithmetic Functions, primitive roots, Quadratic congruences and quadratic reciprocity law, Primality and Factoring, Simple Cryptosystems, RSA Cryptosystem. Groups, Group identity and uniqueness, inverse and its uniqueness, isomorphism and homomorphism, subgroups, Cosets and Lagrange's theorem, Permutation group and Cayley's theorem (without proof), Error Correcting codes and groups, Normal subgroup and quotient groups.

Unit – 4:
Graph Terminology, Isomorphism, Isomorphism as relations, Cut-Vertices, Menger's Theorem, Planar graphs, Euler's formula (proof), four color problem (without proof) and the chromatic number of a graph, Euler graphs, Hamiltonian graphs, five color theorem, Vertex Coloring, Edge Colouring. Trees terminology, in order, preorder & post order trees traversal algorithms, directed graphs, Computer representation of graphs, Shortest path and minimal spanning trees and algorithms, Depth-first and breadth first searchs, trees associated with DFS & BFS, Connected components. Complexity Analysis and proof of correctness of the graph MST, traversal and Shortest path algorithms.

Text/Reference:
[1]   J.P. Tremblay & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science," TMH, New Delhi (2000).
[2]   Kolman, Busby & Ross "Discrete Mathematical Structures", PHI/Pearson.
[3]   D.S. Malik and M. K. Sen, "Discrete Mathematical Structures", Thomson Learning, 2006.
[4]   C.L.Liu, "Elements of Discrete Mathematics", McGraw Hill Book Company.
[5]   G. Haggard,J. Schlipf and S. Whitesides, "Discrete Mathematics for Computer Science", Thomson Learning, 2006.
[6]   J. L. Hein, "Discrete Structures, Logic and Computability", Narosa, 2002.
[7]   Neal Koblitz, "A course in number theory and cryptography", Springer – Verlag, 1994.
[8]   V. Shoup, "A Computational Introduction to Number Theory and Algebra", CUP, 2005.
[9]   John F. Humphreys, "A Course in Group Theory", OUP, 2001.
[10]   G. Chartrand, P. Zhang, "Introduction to graph theory", TMH, 2005.
[11]   A .V. Aho, J . E . Hopcroft, J . D . Ulman "The Design & Analysis of Computer Algorithms", Pearson Education.
[12]   T .H . Cormen, C . E . Leiserson, R .L . Rivest "Introduction to Algorithms", PHI/Pearson.
[13]   V . Manber "Introduction to Algorithms – A Creative Approach", Pearson Education.
[14]   Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", Computer Science Press.
[15]   Iyengar, Chandrasekaran and Venkatesh, "Discrete Mathematics", Vikas Publication.

Paper ID: 15212

Code: IT212 **Paper : Software Engineering**

	L	T/P	C
	3	1	4

UNIT – 1:
Introduction:
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.

Software Metrics:
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

UNIT – 2:
Software Project Planning:
Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Software Requirement Analysis and Specifications:
Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping.

UNIT – 3:
Software Design:
Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calender time Component, Reliability Allocation.

UNIT – 4:
Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:
Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Text:
1. R. S. Pressman, "Software Engineering – A practitioner's approach", 3rd ed., McGraw Hill Int. Ed., 1992.
2. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2001

Reference:
1. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
3. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
4. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons
5. I. Sommerville, "Software Engineering ", Addison Wesley, 1999.

Practicals:

		L	T/P	C
Code: IT252				
Paper ID:15252	**Paper: Java ProgrammingLab.**	**0**	**2**	**1**

Practicals based on IT202.

		L	T/P	C
Code: IT254				
Paper ID:15254	**Paper: Multimedia Lab.**	**0**	**2**	**1**

Practicals based on IT204.

		L	T/P	C
Code: IT256				
Paper ID:15256	**Paper: Switching Theory and Logic Design Lab.**	**0**	**2**	**1**

Practicals based on IT206.

		L	T/P	C
Code: IT258				
Paper ID:15258	**Paper: Software Engineering Lab.**	**0**	**2**	**1**

Practicals based on IT212.