GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

TWENTY SIXTH MEETING

OF THE

ACADEMIC COUNCIL

DATE	:	19.01.2009
TIME	:	12 noon
VENUE	:	CONFERENCE ROOM

MINUTES

KASHMERE GATE, DELHI-110403

117/c

TWENTY SIXTH MEETING OF THE ACADEMIC COUNCIL
HELD ON 19TH JANUARY 2009

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It was noted that the above Schemes of Examination and Syllabi have been approved by the Vice Chancellor as per the powers delegated vide Academic Council's decision no.25.13.

It was, however, observed by Director (Academic Affairs) that a Post Graduate programme of two years duration should have at least 100 credits whereas the MBA (Real Estate) Programme is having only 85 credits. Dean, USMS was requested to redraft the scheme and syllabi of MBA (Real Estate) Programme for the students who will take admission in future for the existing MBA (Real Estate). However, for the existing students of MBA (Real Estate Programme), Scheme of Examination & Syllabi already approved shall continue.

Agenda Item No. 26.11   **To approve Scheme of Examination and Syllabi of B. Tech. (Biotechnology) and M. Tech. (Biotechnology).**

The Academic Council noted the scheme of Examination and Syllabi presented before it.

It was noted that the above Schemes of Examination and Syllabi have been approved by the Vice Chancellor as per the powers delegated vide Academic Council's decision no.25.13.

Agenda Item No. 26.12   **To approve Scheme of Examination & Syllabi of various courses being conducted at USIT.**

The Academic Council noted the following Schemes of Examination and Syllabi presented before it:

(i)	M. Tech. (VLSI)	-	C-DAC, NOIDA
(ii)	MCA (SS) for lao PDR students	-	USIT
(iii)	M. Tech. (IT) – Regular	-	USIT
(iv)	M. Tech. (CSE) – Regular	-	USIT
(v)	B. Tech. / M. Tech. (CSE) – Regular -		USIT
(vi)	B. Tech. / M. Tech. (ECE) – Regular -		USIT

Agenda Item No. 26.13   **To approve Scheme of Examination & Syllabi of various courses being conducted at USAP and Modification in respect of Conduct and Evaluation of Examination for 5 years full time programme leading to B. Arch. Programme following the Annual System of Examination.**
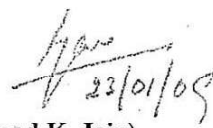
The Academic Council noted the scheme of Examination and Syllabi presented before it.

It was noted that the above Schemes of Examination and Syllabi have been approved by the Vice Chancellor as per the powers delegated vide Academic Council's decision no.25.13.

Agenda Item No. 26.14   Any other item with the permission of the Chair.

In the end, the Academic Council resolved to place on record the appreciation for Prof. K. K. Aggarwal, the founder Vice Chancellor of the University for the contribution made by him in establishing this University and taking it to the level which it has attained. All the members of the Academic Council assured the new Vice Chancellor their utmost cooperation and wished him a great success during his tenure as the Vice Chancellor of this University.

Meeting ended with a vote of thanks to the Chair.

23/01/05

(Vinod K. Jain)
Registrar /
Secretary to the Academic Council

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
Delhi**
www.ipu.ac.in

Approved by the Academic Council in its 26th meeting held on 19-01-2009 vide agenda item 26.12 w.e.f. 2009

Vision of the School

Create high-quality engineering professionals

Mission of the School

To serve humanity by creating professionally competent, socially sensitive engineers with high ethical values who can work as individuals or in groups in multicultural global environments.

Programme Outcomes

1. ***Engineering Knowledge*** (**PO01**): Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. ***Problem Analysis*** (**PO02**): Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. ***Design/Development of Solutions*** (**PO03**): Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. ***Conduct Investigations of Complex Problems*** (**PO04**): Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:
   a. that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;
   b. that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions;
   c. that require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.;
   d. which need to be defined (modelled) within appropriate mathematical framework; and
   e. that often require use of modern computational concepts and tools, for example, in the design of an antenna or a DSP filter.
5. ***Modern Tool Usage*** (**PO05**): Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. ***The Engineer and Society*** (**PO06**): Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. ***Environment and Sustainability*** (**PO07**): Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. ***Ethics*** (**PO08**): Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. ***Individual and Team Work*** (**PO09**): Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. ***Communication*** (**PO10**): Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. ***Project Management and Finance*** (**PO11**): Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. ***Life-long Learning*** (**PO12**): Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Programme Education Objectives (PEO)

PEO 1: Our students will apply their knowledge and skills to succeed in their careers and/or obtain an advanced degree.

PEO 2: Our students will behave ethically and responsibly, and will remain informed and involved as full participants in their profession and society.

PEO 3: Our students will creatively solve problems, communicate effectively, and successfully function in diverse and inclusive multi-disciplinary teams.

PEO 4: Our students will apply principles and practices of information technology to identify, implement, and enable effective technologies and apply fundamental computing knowledge to solve information technology problems and be capable of doing research.

Programme Specific Outcomes (PSO)

On completion of the programme of study, the students will have the ability to:

PSO 1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

PSO 2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

PSO 3: Communicate effectively in a variety of professional contexts.

PSO 4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

PSO 5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

PSO 6: Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems.

PEO to PO Mapping

PEO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
PEO 1	3	1	1	1	1	1	1	1	1	1	1	3
PEO 2	1	-	-	-	-	3	3	3	-	-	-	3
PEO 3	3	3	3	3	3	2	2	1	1	3	3	-
PEO 4	3	3	3	3	3	-	-	-	1	1	3	-

(scale 1: low, 2: Medium, 3: High)

PSO to PO Mapping

PSO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
PSO 1	3	3	-	3	-	-	-	-	-	-	-	3
PSO 2	-	3	3	3	3	1	1	-	-	-	-	3
PSO 3	-	-	-	-	-	3	-	-	3	3	3	-
PSO 4	-	-	-	-	-	3	3	3	1	-	-	-
PSO 5	-	-	-	-	-	-	-	1	3	1	3	-
PSO 6	1	3	3	3	3	1	1	1	-	-	-	3

(scale 1: low, 2: Medium, 3: High)

Duration: 4 + 2 Years.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY DELHI
Bachelor / Master of Technology (Dual Degree)
Information Technology

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

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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**

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Fifth Semester

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

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**

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Information Technology

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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Bachelor / Master of Technology (Dual Degree)
Information Technology

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
4. No student is allowed to enter into 9th semester, till student becomes eligible to be awarded B.Tech.

FIRST SEMESTER

Code: HS 101

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

	L	T/P	C
	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.

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Paper Code: BA-103   **L**   **T/P**   **C**
Paper ID: 99103   **Paper: Chemistry-I**   **2**   **1**   **3**

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**

<div align="center">

SKILL DEVELOPMENT & EMPLOYABILITY

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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)

- C data types, int, char, float etc.
- C expressions, arithmetic operations, relational and logic operations.
- C assignment statements, extension of assignment to the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions.
- C statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.
- Concepts of loops, example of loops in C using for, while and do-while, Optionally continue may be mentioned.
- One dimensional arrays and example of iterative programs using arrays, 2-d arrays.
- Use in matrix computations.
- Concept of Sub-programming, functions, Example of functions, Argument passing mainly for the simple variables.
- Pointers, relationship between arrays and pointers, Argument passing using pointers, Array of pointers, Passing arrays as arguments.
- Strings and C string library
- Structures and Unions. Defining C structures, passing strings as arguments,programming examples.
- 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
Paper ID: 99109 Paper : Mathematics – I

	L	T/P	C
	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
 (Fresnal 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

Paper Code: HS -119

<div align="right">

L	T/P	C
1	-	1

</div>

Paper ID-98119   **Paper :Impact of Science and Technology on society I**

Unit – I:

Sociology of Scientific Knowledge: What is the relationship between science and the social?– Conventional view of philosophers and historians of science-Sociology of Science (Karl Manheim-Robert K. Merton)

Unit – II:

Social Function of Science-(Joseph Bernal)-The Radical Science Movement-the Kuhnian intervention-Science as a social activity: Strong Programme-Laboratory Studies/ethnography of science- Actor Network Theory (Bruno Latour)-communicating science to peers- scientific controversies-public engagement with S&T-the changing configuration of science- mode II knowledge production

Unit – III:

Technology – Society Interface Technoscience and the Interpenetration of Science & Technology Questioning of the traditional boundary between science (knowing) and technology (doing)—how science and technology together shape the ways in which knowledge is constructed---Technological Determinism, Power and the Politics of Knowledge Production

Unit - IV

Social-Psychological Theories of Innovation: What are the bases of innovation? Whether everyone is innovative? Why one is innovative and others are not? Such individual level question will be asked in this unit and try to look into individual level motivation to innovate, neurophysiological basis of innovations and social factors which affect innovations.

Text Books:
 1.Collins, Harry and Pinch, Trevor 1993 : The Golem: What Everyone should Know about Science. Cambridge: Cambridge University Press.
2.Hess, David J. 1995. Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artefacts. New York: Columbia Press.
3. Hess, David J. 1997. Science Studies: An Advanced Introduction. New York: NewYork University Press.
4. Jasanoff, Sheila et al. (eds.). 1995. Handbook of Science and Technology Studies. Thousand Oaks, CA: Sage Publications.

SECOND SEMESTER

Code: HS102

Paper ID:98102 **Paper: Communication Skills – II**

L	T/P	C
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.

Mathematics - II

	L	T/P	Credits
	3	1	4

I.   Linear Algebra: Linear Independence and dependence of vectors, Systems of linear equations – consistency and inconsisitency, Gauss elimination method, rank of a matrix, Bilinear, Quadratic, Hermitian, Skew – Hermitian Forms, Eigenvalues and Eigenvectors of a matrix, diagonalization of a matrix, Cayley – Hamilton Theorem (without proof).

10 hrs.

II.   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 Bernouilli equations, operator method, method of undetermined coefficients and nonhomogenous, operator method, method of undetermined 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.

10 hrs.

III.   Complex Variables: Curves and Regions in the Complex Plane, Complex Functions, Limits, Derivative, Analytic Function, Cauchy-Riemann Equations, Laplace's Equation, 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 for obtaining Power Series, Analyticity at Infinity, Zeroes, Singularities, Residues, Residue Theorem, Evaluation of Real Integrals.

18 hrs.

IV.   Probability: Definition of Sample Space, Event, Event Space, Conditional Probability, Additive and Multiplicative law of Probability, Baye's Law theorem, Application based on these results.

5 hrs.

Suggested Text Books & References

1.   M. K. Singhal & Asha Singhal "Algebra", R. Chand & Co.
2.   Shanti Narayan, "Matrices" S. Chand & Co.
3.   G. B. Thomas and R. L. Finney, "Calculus and Analytic Geometry" Addison Wesley / Narosa.
4.   E. Kreyszig, "Advanced Engineering Mathematics", 5th Edition, Wiley Eastern Ltd. 1985.
5.   N. M. Kapoor "Differential Equations" Pitamber Pub. Co.
6.   Schaum Outline Series "Differential Equations" Mc. Graw Hill.
7.   Schaum Outline Series "Complex Variables" Mc. Graw Hill.
8.   Schaum Outline Series "Linear Algebra" Mc. Graw Hill.
9.   Schaum Outline Series "Probability" Mc. Graw Hill.

PHYSICS - II

	L	T/P	Credits
	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 distributions: Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac statistics, their comparisons, Ferminos and Bosons Applications: Molecular speed and energies in an ideal gas. The Black body spectrum, the failure of classical statistics to give the correct explanations – the applicatons 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 by Kittle
4. Electronic Principles: Malvino
5. Statistical Mechanics by Garg Bansal and Ghosh (TMH)

STATISTICS, THEORY OF PROBABILITY AND LINEAR PROGRAMMING

Paper Code: BA – 114
Paper ID:99114

	L	T/P	Credits
	2	1	3

I.   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.

II.   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", Mc Graw Hill
5.   Hadley, "Linear Programming" Narosa Publications.

CHEMISTRY – II

Paper Code: BA – 118
Paper ID:99118

	L	T/P	Credits
	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 H2 molecule, characteristics of covalent compound, co-ordinate bond-Werner's Theory, effective atomic numbers, A hybridization and resonance, Valence 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 reaction, effect of temperature on heat of reaction at constant pressure (Kirchoff's Equation) heat to 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-Lindermann, 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 – concept of promoters, inhibitors and poisoning, Physiosorption, Chemisorption, Suface area, Industrially important process. Theories of catalysis.

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

Paper Code: HS -126   **L**   **T/P**   **Credits**
                                                                                  1   **-**   **1**

Paper ID-98126   **Paper : Impact of Science and Technology on society II**

Unit – I

Technology in Context: Perspectives in STS Studies This section examines various perspectives on Technology in STS studies A) Social Shaping of Technology B) Social Construction of Technology C) Actor Network Theory D) Transition in Socio-Technical Systems: Multi-Level Perspective E) Critical Theory of Technology

Unit – II

Gender and Technology How gender influences technologies and the social organization of scientific and technical workspaces---technologies constructed as masculine and feminine—technologies as both 'liberating' and 'limiting' women---contributions of Cynthia Cockburn & Donna Haraway

Unit – III

Public Engagement with Technology Contributions of Trench, Lewenstein, Jasanoff & Vishvanathan---governance and ethical issues in the context of emerging technologies-----constructing risk….role of State, civil society organizations and industry---regulatory dilemmas of transnational capitalism and influence of local contexts—democratisation and 'up-stream' public engagment with technology

Unit – IV

Innovation and its impact in the society: Whether all innovations are good or bad? Who are benefited from these innovations? Is there any difference between formal and informal sector innovations. These questions will be discussed in this unit. We will look into innovation and its role in the development process, what are the policy implications of innovation and some specific cases such as grassroots innovations will be taken up to understand the role of innovations in the society.

Text Books:
 1.Collins, Harry and Pinch, Trevor 1993 : The Golem: What Everyone should Know about Science. Cambridge: Cambridge University Press.
2.Hess, David J. 1995. Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artefacts. New York: Columbia Press.
3. Hess, David J. 1997.   Science Studies: An Advanced Introduction. New York: NewYork University Press.
4. Jasanoff, Sheila et al. (eds.). 1995. Handbook of Science and Technology Studies. Thousand Oaks, CA: Sage Publications.

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.

THIRD SEMESTER

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.
[10]   Allan h. robbins and Wilhelm c. Miler, "Circuit Analysis" , Cengate Learning,2008

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

SKILL DEVELOPMENT & EMPLOYABILITY

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.
11.   Russell L. Meale and Robert Diffenderfer, "Electronic Circuit & Devices", Cenage Learning, 2008
12.   Robert Diffenderfer, "Electronic Circuit & Devices", Cenage Learning, 2008

				L	T/P	C

PaperID:15207   **L**   **T/P**   **C**

Code: IT207   **Paper: Object Oriented Programming**   **3**   **1**   **4**

                                    using C++

SKILL DEVELOPMENT & EMPLOYABILITY

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**

SKILL DEVELOPMENT & EMPLOYABILITY

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**

SKILL DEVELOPMENT & EMPLOYABILITY

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				
Paper ID:15251	**Paper: Electronic Devices and Circuits Lab.**	**0**	**2**	**1**

Practicals based on IT205.

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

Practicals based on IT201.

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

Practicals based on IT207.

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

Practicals based on IT207.

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

Practicals based on IT211.

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FOURTH SEMESTER

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

SKILL DEVELOPMENT, EMPLOYABILITY & ENTERPRENEURSHIP

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		**L**	**T/P**	**C**
Code: IT212	**Paper : Software Engineering**	**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.

FIFTH SEMESTER

Code: IT 305   L:3 T/P:1 C: 4
Paper ID: 15305   Paper: Computer Architecture
SKILL DEVELOPMENT & ENTERPRENEURSHIP

Unit I
Computer Arithmetic and Register transfer language:
Unsigned notation, signed notation, binary coded decimal, floating point numbers, **IEEE 754 floating point standard**, Micro-operation, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit.

Unit II
Instruction set architecture & computer organization
Levels of programming languages, assembly language instructions, **8085 instruction set architecture**, Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts

Unit III
Control Design:
Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), Micrprogrammed computers, Micro coded CPU: Pentium processor
CPU Design
Specifying a CPU, Design & implementation of simple CPU, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, **Internal architecture of 8085 microprocessor**.

Unit IV
Memory organization
Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-speed memories
Input/Output organization
Asynchronous Data Transfers, Programmed I/O, interrupts, Direct memory Access, Serial communication, UARTs, **RS-232-C & RS-422** standard

Text:
1.   J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
2.   J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.
Reference:
1.   J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.
2.   W. Stallings, "Computer organization and Architecture", PHI, 7th ed, 2005.
3.   B. Parhami, "Computer Architecture: From Microprocessors to Supercomputers", Oxford University press, 2006.

Code: IT 307   **L:3 T/P:1 C: 4**
PaperID: 15307   **Paper : Digital Signal Processing**

Unit I

Signals and signal Processing: Characterization & classification of signals, typical Signal Processing operations, example of typical signals, typical Signals Processing applications.

Time Domain Representation of Signals & Systems: Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems.

Unit II

Transform-Domain Representation of Signals: Discrete Fourier Transform (DFT), DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of z-transform.

Unit III

Computation of the Discrete Fourier Transform: Computational complexity of the direct computation of the DFT, different approaches for reducing the computations, Decimation-in-Time FFT algorithms, Decimation-in-frequency FFT algorithms.

Unit IV

Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Signal Flow Graph Representation, FIR Digital Filter Structure, IIR Filter Structures, Parallel all pass realization of IIR Filter design based on Frequency Sampling approach.

Text / Reference:
1. A. Y. Oppenhein and R. W. Schater, "Digital Signal Processing", PHI 1975.
2. Sanjit K. Mitra, "Digital Signal Processing: A Computer based approach", TMH, 2005.
3. J. G. Proakis and D.G. Manolakis, "Digital Signal Processing, Principals, Algorithms, and Applications", Pearson Education, 4th ed., 2007.
4. A. Y. Oppenhein, R. W. Schater and J. R. Buck, "Discrete Time Signal Processing", PHI 1999

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PaperID: 15309   **Paper: Object Oriented Software Engineering**
SKILL DEVELOPMENT & EMPLOYABILITY

Unit I
Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models.

Object Methodology & Requirement Elicitation: Introduction to object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation.

Unit II
Architecture: Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model

Unit III
Modeling with UMLZ: Basic Building Blocks of UML, A conceptual Model of UML, Basic Structural Modeling , UML Diagram
System Design: Design concepts & activities, Design Models, Block design, Testing

Unit IV
Testing Object Oriented Systems: Introduction, Testing Activities & Techniques, The Testing Process, Managing Testing

Case Studies

Text Books:

1.   I. Jacobson, "Object-Oriented Software Engineering: A Use Case Driven Approach", Pearson, 1992
2.   B. Breugge and A. H. Dutoit, "Object Oriented Software Engineering: Using UML, Patterns, and Java", Prentice Hall, 2004.
3.   G. Booch, J. Rumbaugh and I. Jacboson, "The Unified Modeling Language User Guide" Addison-Wesley, 2005

Code No.: IT 313   **L:3 T/P:1 C: 4**
Paper ID: 15313   **Paper: Communication Systems**

Unit I
Classification of signals & systems, Fourier Series, Fourier transforms and their applications to system analysis. Representations of random signals, Concept of Probability, Probability distribution Function, Probability density Function, Gaussian, Binomial, Raleigh and Poisson's distribution, Random Process, Correlation Function, Power Spectral Density, Response of Linear systems to random signals. Gaussian distribution, Central Limit theorem, Ergodicity, co-variance.

Unit II
Concepts of Modulation, Various Analog modulation and demodulation techniques (AM, FM, PM). Multiplexing,

Unit III
Analog to Digital Conversion, Various pulse modulation techniques (PAM, PPM, PWM & PCM). Delta Modulation.

Unit IV
Introduction to Information Theory & Noise: Introduction, Noise its sources, mathematical representation of noise, noise temperature, S/N ratio & Noise figure. Measure of Information, Channel Capacity, Bandwidth S/N trade off.

Text:
1. W. Tomasi, "Electronic communications systems(baics through advanced)", Pearson Education, 2th ed, 2004.
2. H. Taub and D. L. Schilling, "Principles of Communication Systems", TMH, 1992.

Reference:
1. J. C. Hancock, "An Introduction to the Principles of Communication Theory", McGraw Hill, 1961.
2. S. Haykins, "Introduction to Analog and Digital Communication", Wiley, 1986.
3. G. Kennedy and B. Davis, "Electronic communication systems", TMH, 1993.
4. J. G. Proakis, M. S.alehi, "Communications Systems Engineering", PHI, 2nd ed, 2002.
5. D. Roddy and J. Coolen, "Electronic Communications", PHI, 1995.
6. S. Haykins, "Communication Systems", Wiley, 2001.

Paper ID: 15315   **Paper: Linux & Win32 Programming**

SKILL DEVELOPMENT & EMPLOYABILITY

Linux:

Unit I

Linux overview, Compiler options, libraries, make, file system objects, error handling, I/O, file locking, manageing files, directory management, temporary files and cleanup, command line processing.

Unit II

UserID, password and group management; signals, and signal handling, process management, fork and exec, regular expression, IPC, message queues, semaphores, shared memory, memory mapped files, Introduction to X-Windows.

Win32:

Unit III

Windows environment, Windows programming options, Windows and messages, text, controls, keyboard management, Mouse management, Timer, Child window controls, Menus and other resources, Dialog boxes, Clipboard management

Unit IV

GDI, Printer management, Bitmaps and Bitblts, Device Independent Bitmaps, Palette manager, Metafiles, Multiple Document Interface, Introduction to MFC.

Text:
1. K. Wall, M. Watson, and M. Whitis, " Linux Programming Unleashed", SAMS, 1999.
2. C. Petzold, "Programming Windows: The definitive guide to Win32 API", Microsoft Press, 5th Eds., 1998.

Code No.: IT 317 L:3 T/P:1 C: 4
Paper ID: 15317 **Paper: Operating System**

Unit I.
Introduction to the Operating System

Types of OS: Batch System, Time Sharing System, Real Time System, Multiuser/Single User System

Functions of Operating System: Process Management, Memory Management, File Management, I/O Devices Management, Information Management.

Process Management : Process concepts, Process State, Process Control Block, Process Scheduling, Context Switch, CPU Scheduling, Scheduling Criteria, Scheduling Algorithms, Pre Emptive/ Non Preemptive Scheduling, Threads, Thread Structure.

Unit II
Process Synchronisation: Critical Section Problem, Race Condition, Synchronisation Hardware, Semaphores, Classical Problems of Synchronisation.

Dead Locks: Characterisation, Methods for Handling Deadlocks Avoidance, Recovery and Detection.

Unit III
Memory Management: Contiguous Allocation, External Internal Fragmentation, Paging, Segmentation, Segmentation with Paging.

Unit IV
Virtual Memory: Virtual Memory Concepts, Access Methods, Directory Structure, allocation Methods; Contiguous Allocation, Linked Allocation, Indexed Allocation Free Space Management.

Device Management: dist Structure, Disk Scheduling Algorithms, Disk Management, Case study on DOS, Windows 2000, Windows XP, Linux.

Text:
1. Silbershatz and Galvin, "Operating Systems Concepts", Addition Weseley, 2002
2. Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition, 2003
3. Godbole Ahyut, "Operating System", PHI, 2003

References:
1. Charles Crowley, "Operating Systems, Tata Mcgraw-Hill Edition.
2. A.S. Tannenbaum, "Operating System Concepts", Addition Weseley, 2002

Code No.: IT 302   **L:3 T/P:1 C: 4**
Paper ID: 15302   **Paper: Microprocessors**

Unit I
Introduction – Microprocessors Evolution and types (Intel 4004 – Pentium IV and road maps), Overview of 8085, 8086, 80286, 80386, 80486, Pentium processors and Micontrollers.

Unit II
Architecture of 8086 – Register Organization, Execution unit, Bus Interface Unit, Signal Description, Physical Memory Organization, General Bus Operation, I/O addressing capabilities, Minimum mode and maximum mode timing diagrams, Comparison with 8088

Unit III
8086 programming – Assembly language program development tools (editor, linker, loader, locator, Assembler, emulator and Debugger), Addressing modes, Instruction set descriptions, Assembler directives and operators, Procedures and Macros. (Writing programs for use with an assembler MASM)

Unit IV
8086 Interfacing – Interfacing 8086 with semiconductor memory, 8255, 8254/ 8243, 8251, 8279, A/D and D/A converters. Numeric processor 8087, I/O processor 8089 tightly coupled and loosely coupled systems.

Text:
1.   D.V. Hall, "Microprocessors and Interfacing", TMH, 2nd Ed. 1991.
2.   Y.-C. Liu and G. A. Gibson, "Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design", PHI, 2000.

References:
1.   J. L. Antonakes, "An Introduction to the Intel Family of Microprocessors", Thomson, 1996.
2.   K. J. Ayala, "The 8086 microprocessor", Thomson, 1995
3.   Peter Able, "IBM PC assembly language programming", PHI, 2000.
4.   A. K. Ray and K M Bhurchandi, "Advanced Microprocessors and Peripherals", TMH, 2000.

Paper Code: IT 304   **L:3 T/P:1 C: 4**
PaperID:15304   **Paper: Computer Networks**

<div align="center">Unit I</div>

Introduction: Uses of Computer Networks, Network and Protocol Architecture, Reference Model (ISO-OSI, TCP/IP-Overview

Physical Layer: Data and signals, Transmission impairments, Data rate limits, performance factors, Transmission media, Wireless transmission, Telephone system (Structure, trunks, multiplexing & Switching)

Unit II

Data Link Layer: Design issues, Error detection & correction, Data Link Protocols, sliding window protocols, HDLC,WAN Protocols.

Unit III

Medium Access Sub layer: Channel allocation problem, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Network Devices-repeaters, hubs, switches bridges.

Unit IV

Network Layer: Design issues, Routing algorithms, congestion control algorithms, Internetwork protocols, Internetwork operation

Text :
1. B. A Forouzan.,"Data Communications & Networking",4th Ed, Tata McGraw Hill, 2007.
2. A. S. Tanenbaum. "Computer networks", Pearson Education, 4th ed , 2006.

References:
1. W. Stallings, "Data and Computer Communications", Pearson Education, 8th Ed, 2007.
2. D. E. Comer., "Computer Networks & Internets", Pearson Education, 4th Ed, 2007
3. N. Olifer and V. Olifer, "Computer Networks", Wiley, 2006
4. L. L. Peterson and B. S. Davie, "Computer Networks",Elsevier,4th Ed, 2007.
5. L. A. Gallo, "Computer Communications & networking technologies", Cengage Learning, India 1st Ed, 2007.

Code: IT 306   **L:3 T/P:1 C: 4**
Paper ID: 15306   **Paper: Algorithm Analysis and Design**

<div align="center">Unit I</div>

Growth of Functions, Summations, Algorithm Design Paradigms, Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort, Medians and Order Statistics, Disjoint Set operations, Linked List representation of disjoint sets, disjoint set forests.

<div align="center">Unit II</div>

Matrix Chain Multiplication, Strassen's algorthim for matrix multiplication, LCS, Optimal Binary Search Tree, General Greedy approach Vs Dynamic Programming approachm Case studies: Knapsack problem, Huffman Coding Problem, Matroids

<div align="center">Unit III</div>

Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithms of Kruskal's and Prim's, Dijkstra's and Bellman ford algorithm, All pair shortest path, Flyod Warshall Algorithm

<div align="center">Unit IV</div>

String Matching: The Naïve String Matching Algorithm, The Rabin Karp Algorithm, String Matching with Finite Automata, The Knuth Morris Pratt Algorithm.

NP-Complete Problems: Polynomial Time Verification, NP-Completeness and Reducibility, NP Completeness proof, NP-Complete Problems.

Text:
1. T .H . Cormen, C . E . Leiserson, R .L . Rivest, "Introduction to Algorithms", PHI, 2001.

References:
1. A .V. Aho, J . E . Hopcroft, J . D . Ulman "The Design & Analysis of Computer Algorithms", Addison Wesley, 1998.
2. U . Manber "Introduction to Algorithms – A Creative Approach", Addison Wesley, 1998.
3. E. Horwitz and S. Sahani "Fundamentals of Computer Algorithms", Galgotia, 1998.
4. P. Linz, "An Introduction to Formal Languages and Automata", Narosa Publishing House, 2000.
5. J.E.Hopcroft and J.D.Ullman, "Introduction to Automata Theory, Languages and Computation", Addison Wesley, 1998.
6. K.L.Mishra & N.Chandrasekaran, "Theory of Computer Science", PHI,1996.
7. John C.Martin, "Introduction to Languages and Theory of Computation", TMH, 2001.

Code: IT 314   **L:3 T/P:1 C: 4**
Paper ID: 15314   **Paper: Digital System Design**

Unit I
Introduction to HDLs, Design Flow, Synthesis, VHDL Basics, Data types, Operators, Concurrent coding, Structural and Behavioural Modelling, Design of Adder, Substractor, Decoder, encoder, Code converter, Multiplexer, VHDL for Combinational Circuits, Blocks, Generate Statements.

Unit II
Sequential Code, Control Structure, Attributes, VHDL for Flip Flops, Design of Shift Registers & Counters using VHDL, Design of memory using VHDL, Signals and Variable.

Unit III
VHDL timing, modelling with Delta time Delays, Inertial/Transport Delay, Packages and Libraries, Function, Procedure, Resolution Function, Operator Overloading, RTL systems: Organization of systems, Data Subsystem, Control Subsystem.

Unit IV
Testing and the Test Bench: Manufacturing Testing, Functional Testing, Test Benches, VHDL Test Bench, Files and Text I/O.
Programmable Logic Arrays (PLAs), PALs, Study of architecture of FPGA and CPLD, Case study of FPGA device Virtex 5 family.

Text:
1. C. H. Roth and John, "Principle Digital System Design using VHDL", Cenage Learning 2008
2. V. A. Pedroni, "Circuit Design with VHDL", PHI, 2005

References:
1. B. Cohen, "VHDL coding Styles and Methodologies", Springer, 2005
2. J F Wakerly, "Digital Design Principles and Practice" , Pearson Education Press 2007
3. S. Ghose, "Hardware Description Languages", PHI 2005
4. P.J. Ashendern, "The Designer Guide to VHDL", Morgan Kaufmann, 2005
5. D J Smith , "HDL Chip Design", Don Publisher, 2005
6. D. L. Perry, "VHDL programming", TMH, 2005
7. K.C. Chang and M Loeb, "Digital Systems Design with VHDL and Synthesis", Wiley, 2005
8. J. Bhaskar , "A VHDL Synthesis Primer", BSP, 2006.
9. J. Bhaskar, "A VHDL Primer", Pearson Education, 2005
10. S. Lee, "Advanced Digital Logic Design Using VHDL, State Machines, and Synthesis for FPGA's", Morgan Kaufmann, 2007
11. B. Vransesic, "Fundamental of Digital Logic Design with VHDL", TMH, 2007.

Code: IT 316   **L:3 T/P:1 C: 4**
Paper ID: 15316   **Paper: Digital Communication**

Unit I
PULSE MODULATION
Sampling process – PAM – other forms of pulse modulation – Bandwidth – Noise trade off – Quantization –PCM –Noise considerations in PCM Systems – TDM – Digital multiplexers – Virtues, Limitation and modification of PCM – Delta modulation – Linear prediction – Differential pulse code modulation – Adaptive delta Modulation.

Unit-II
BASEBAND PULSE TRANSMISSION
Matched Filter – Error Rate due to nose – Intersymbol Interference – Nyquist's criterion for Distortionless Base band Binary Transmission – Correlative level coding – Baseb and M -ary PAM transmission – Adaptive Equalization – Eye patterns.

Unit III
PASSBAND DATA TRANSMISSION
Introduction – Pass band Transmission model – Generation, Detection, Signal space diagram, bit error probability and Power spectra of BPSK, QPSK, FSK and MSK schemes – Differential phase shift keying -Comparison of Digital modulation systems using a single carrier – Carrier and symbol synchronization.

Unit IV
ERROR CONTROL CODING
Discrete memoryless channels – Liner block codes – Cyclic codes – Convolutional codes – Maximum, likelihood decoding of convolutional codes – Viterbi Algorithm, Trellis coded Modulation, Turbo codes.

SPREAD SPECTRUM MODULATION
Pseudo – noise sequences – a notion of spread spectrum – Direct sequence spread spectum with coherent binary phase shift keying – Signal space Dimensionality and processing gain – Probability of error – frequency – hop spread spectrum – Maximum length and Gold codes.

Text:
1. Simon Haykins, "Communication Systems" John Wiley, 4th Edition, 2001

References:
1. Sam K. Shanmugam "Analog and Digital Communication " John Wiley, 2002.
2. John G.Proakis, "Digital Communication" McGraw Hill 3rd Edition,1995.
3. H. Taub and D. L. Schilling, "Principles of Communication Systems", TMH, 2003.

Paper Code: IT-401   **L:3 T/P:1 C:4**
Paper ID: 15401   **Paper: Advanced Computer Networks**
SKILL DEVELOPMENT & EMPLOYABILITY

Unit -I
Review of Physical, Data link layer, TCP/IP: Datalink Protocols; ARP and RARP.
 Unit-II
Network Layer: Routing algorithms and protocols, Congestion control algorithm, Router Operation, Router configuration, Internetworking, IP Protocol, IPv6 (an overview), Network layer in ATM Network.
 Unit-III
Transport Layer: Transport Service, Transport Protocol (TCP, UDP, ATM AAL layer protocol).

Application layer: Security, DNS, SNMP, RMON, Electronic Mail, WWW.
 Unit-IV
Network Security: Firewalls (Application and packet filtering), Virtual Public Network.

Text:
1.   Tananbaum A.S., "Computer Networks", 3rd Ed, PHI, 1999.
2.   Laura Chappell (ed), "Introduction to Cisco Router Configuration", Techmedia, 1999.

References:
1.   Black U., "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
2.   Stallings W., "Computer Communication Networks", PHI.
3   Stallings W., "SNMP, SNMPv2, SNMPv3, RMON 1&2", 3rd Ed., Addison Wesley, 1999.
4.   Michael A. Miller, "Data & Network Communications", Vikas Publication.
5.   William A. Shay, "Understanding Data Communications & Networks", Vikas Publication.

Paper Code: IT-413   **L:3 T/P:1 C:4**
Paper ID: 15413   **Paper: Front End Design Tools & Web Technologies**

UNIT-I:
History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;, Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT-II
XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX , Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK , Introspection, Using Bound properties, Bean Info Interface, Constrained properties , Persistence, Customizes, Java Beans API, Introduction to EJB's

UNIT-III
Web Servers and Servlets: Tomcat web server, Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues, Introduction to JSP: The Anatomy of a JSP Page. JSP Application Design with MVC , JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing Sharing Session and Application Data Memory Usage Considerations

UNIT IV:
Database Access : Database Programming using JDBC, Studying Javax.sql.* package,Accessing a Database from a JSP Page, Application – Specific Database Actions,Deploying JAVA Beans in a JSP Page, Introduction to struts framework..

TEXT BOOK

1. "Internet and world wide web – How to Program", Deitel & Deitel, Goldberg, Pearson Education
2. "Using HTML 4, XML and JAVA", Eric Ladd, Jim O' Donnel, Prentice Hall of India
3. "Java Server Pages ",Hans Bergsten, SPD O'Reilly

REFERENCES

1 "Web Technology", Rajkamal, Tata McGraw-Hill, 2001. KS:
2.   Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
4. Programming world wide web-Sebesta, Pearson
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly

Unit-I
Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

Unit-II
Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Unit-III
Reducing the number of test cases:

Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

Unit-IV
Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Testing Tools: Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

Text:
1.   William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
2.   Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
3.   Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4.   Louise Tamres, "Software Testing", Pearson Education Asia, 2002

Reference:
1.   Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
2.   Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
3.   K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.
4.   Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
5.   Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
6.   Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
7.   Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.
8.   Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

Unit-I
Fundamentals of Distributed Computing:
Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing.
Distributed Operating Systems:
Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.
Unit-II
Communication:
Layered protocols, RPC, RMI, Remote objects. Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Message Passing, PVM and MPI.
Process Concepts:
Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.
Unit-III
Synchronization:
Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems
Distributed Databases:
Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.
Unit-IV
Parallel Processing:
Basic Concepts: Introduction to parallel processing, Parallel processing terminology, Design of parallel algorithms, Design of Parallel Databases, Parallel Query Evaluation.

Text Books:
1. Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002
2. Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007

Reference Books:
1. Tanenbaum, A, "Modern Operating Systems", 2nd Edition, Prentice Hall India, 2001.
2. Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994
3. Attiya, Welch, "Distributed Computing", Wiley India, 2006
4. Coulouris, Dollimore and Kindberg, "Distributed Systems", Pearson, 2009.

Paper Code: IT-415   **L:3 T/P:1 C:4**
Paper ID: 15415   Paper: Advanced Java Programming
SKILL DEVELOPMENT, EMPLOYABILITY & ENTERPRENEURSHIP

Unit 1 : Distributed Systems for Enterprise and Web-Based Applications , The Challenges of Scalability, Heterogeneity, Security, & Failure , Multi-Tiered Architectures , Messaging & Interfaces , JDBC: Java Database Connectivity , Messaging, Interfaces , RMI: Remote Method Invocation

Unit 2: MVC Architecture, Servlet, Servlet life cycle, web application structure, request response model, JSP pages and its elements JSP Architecture, JSP Page life cycle, Page directive attributes, JSP Tag libraries , JSTL Expression Language (EL) , Writing a Custom Tag Library

Unit 3 Struts, Struts architecture, Struts classes - ActionForward, ActionForm, ActionServlet, Action classes , Understanding struts-config.xml , Struts Tiles , Combining Struts and Tiles, Tiles file structure , Understanding Tiles Definitions and Attributes , Creating a Definition in XML file and deploying , Creating a small application using Tiles

Unit 4 : Distributed System Models , J2EE: JNDI, EJB Entity Beans & Deployment Descriptors , J2EE: EJB Session Beans , Transactions , Web Services , Replication, Localization

Text Books :
> 1. Ivan Bayross , sharanam shah Java Server Programming , shroff Publishers
> 2. Holzner , Structs : Essential skills , TMH

References :
1. Coulouris, G., Dollimore, J., & Kindberg, Distributed Systems, Concepts and Design , Pearson Education
2. Joe wigglesworth , McMilan Paula , Java Programming : advanced topic , Thomson

Unit –I
Introduction to Embedded Systems, Special Challenges with Embedded Systems, Introduction to the 68HC12 and HCS12 Microcontrollers, HCS12 Family, Advantages of programming in assembly Language and HLL, Choosing the best HLL available for Embedded Systems, Structured Programming and Design, Programming & Debugging Procedures, Emulators and Logic analyzers, Cross compiler

Unit-II
Architecture of 68HC12/HCS12 System, Modes of Operations: Normal operating Modes, B32 EVB Modes of Operation, Register Block Relocation, Port System, B32 Memory System, B32 Memory Map, Memory Resource Remapping, HCS12 DP256 Memory System, Exception processing, 68HC12 Interrupt Response

Unit-III
The Timing System-the standard timer module, component of timer module, free running counter and its associated register, I/O channel, Real-time Interrupt, the Enhanced Capture Timer: MC68HC12BE32
Serial Communications, 68HC12 Serial Communication Interface, Serial Peripheral Interface, Input/output interfacing concepts, RS-232 Interface, I^{2}C interfacing, USB Interfacing

Unit – IV
Real-Time Operating Systems: Review of Concepts, Basic Concepts, Types of RTOS, RTOS Issues, Implementing of RTOS, Distributed Processing Systes-Networking with msCAN: Design Approaches, CAN protocol, The controller Unit for the 68HC12 msCAN12, Timing issue

Text book:

1. Embedded Systems: Design and Applications with 68HC12 and HCS12 by Steven F. Barrett and Daniel J. Pack, Pearson Education, 2005

Reference book:

1. Embedded System Design by Raj Kamal, THM, 2005
2. Embedded Microcomputer Systems by Jonathan W. Valvano, Cenage Learning, 2008
3. Real Time System by C. M. Krishna, MGH, 2005
4. Real Time System by Levi and Agarwal, MGH, 2005
5. Real Time System: Specification, Validation & Analysis by Mati Joseph, PHI
6. Real Time System by Jane W.S. Liu, Pearson Education, 2005
7. The Co-design of Embedded Systems: A Unified Hardware Software Representation, Kluwer Academic Publisher, 2002.
8. Introduction to Real-time software design by S. Allworth, Spriner-Verlag, 2004.

UNIT – I
Introduction to Cellular Mobile Systems

A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems. Elements of cellular radio systems Design and interference

General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.

UNIT – II
Cell Coverage for Signal & antenna structures

General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model – characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

Frequency Management and Channel Assignment, Hand Off and Dropped Calls[

Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

UNIT – III
Modulation methods and coding for error detection and correlation

Introduction to Digital modulation techniques, modulation methods in cellular wireless systems, OFDM, Block coding, convolution coding and Turbo coding.

Multiple access techniques: FDMA, TDMA, CDMA

Time – division multiple access (TDMA), code division multiple access (CDMA), CDMA capacity, probability of bit error considerations, CDMA compared with TDMA.

UNIT – IV
Second generation, digital, wireless systems

GSM, IS_136 (D-AMPS), IS-95, Mobile management, voice signal processing and coding.

TEXT BOOKS:
1.   C. Y. Lee and William, "Mobile Cellular Telecommunications", 2nd Ed, McGraw Hill. 2001
2.   Mischa Schwartz, "Mobile Wireless Communications", Cambridge Univ. Press, UK, 2005.

REFERENCES:
1.   Mobile Communication Hand Book", 2nd Edition, IEEE Press. 2002
2.   Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002
3.   Lawrence Harte, "3G Wireless Demystified", McGraw Hill Publications. 2000
4.   Kaveh Pahlavan and Prashant Krishnamurthy, "Principles of Wireless Networks", PHI.2000

Paper Code: IT-421   **L:3 T/P:1 C:4**
Paper ID: 15421   **Paper: Data warehousing & Mining**

Unit-I

Data Warehousing: An Introduction to data ware housing and characteristics of a data warehouse, various aspects of data marts.

On Line Analytical processing: OLTP and OLAP systems, Data Modelling, OLAP Tools, web OLAP, Decision support system.

Unit-II

Developing a Data Ware house: Architectural strategies and Organization Issues, Design Considerations, Tools for Data Warehousing, crucial decisions in designing a Data Ware house using ORACLE 8i / SQL server.

Unit-III

Data Mining: From Data ware housing to Data Mining, Objectives of Data Mining, the Business context for Data mining, Process improvement, marketing and Customer Relationship Management (CRM), the Technical context for Data Mining, machine learning, decision support and computer technology.

Data Mining Techniques and Algorithms: Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modelling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Unit-IV

Data Mining Environment: Case studies in building business environment, Application of data ware housing and Data mining in Government, National Data ware houses and case studies.

Test Books

1. "Mastering Data Mining: The Art and Science of Customer Relationship Management", by Berry and Lin off, John Wiley and Sons, 2001.
2. "Data Ware housing: Concepts, Techniques, Products and Applications", by C.S.R. Prabhu, Prentice Hall of India, 2001.

Reference Books
1.   "Data Mining: Concepts and Techniques", J.Han, M.Kamber, Academic Press, Morgan Kanf man Publishers, 2001.
2.   "Data Mining", by Pieter Adrians, Dolf Zantinge, Addison Wesley,2000.
3.   "Data Mining with Microsoft SQL Server", by Seidman, Prentice Hall of India,2001.

Paper Code: HS-402   **L:2 T/P:0 C:2**
Paper ID: 98402   **Paper: Technical Writing**

Unit-I
Writing Skills: Descriptive, Narrative, Argumentive and Discursive, Reflective and Literary-Evaluative Writing.

Technical Writing: Definition, Purpose and Characteristics of Technical Writing.
Unit-II
The Technical Writing Process: Prewriting Stage, The Writing Stage and the Post-writing stage.

Technical Writing Skills: Researching, Summarizing and Outlining, Visual Aids, Definition, Description, Set of Instructions.
Unit-III
Formal Formatting: Arrangement of Formal Elements, Front Material, Format Devices in the Body of Formal Report-Heading, Pagination, End Material—Citations, References and Bibliography, Appendix.
Unit-IV
Technical Writing Applications: Memorandums and Informal Format, Formal Format, Recommendations and Feasibility Reports, Proposals, Progress Reports, Analysis Reports Professional Communication, Letters and Job Applications.

Presentation and Meetings.

Text/References:
1.   Forsyth, Sandy and Lesley Hutchison, "Practical Composition", Edinburgh Oliver and Boyd, 1981.
2.   Sides, Charles H., "How to Write and Present Technical Information", Cambridge, Cambridge University Press, 1999.
3.   Guffey, Mary Ellen, "Business Communication, Cincinnati", South-Western College Publishing, 2000.

Unit-I

Parallel computer models:

The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers.

Program and network properties:

Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms

Unit-II

Pipelining:

Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines

Unit-III

Arithmetic for computers

Signed and unsigned Numbers, Addition and Subtraction, Multiplication, Division, Floating Point.
CPU Performance and Its factors, Evaluating performance of CPU.

Unit – IV

Memory Hierarchy
Introduction, The basics of Cache, Measuring and Improving of Cache Performance, Virtual Memory, Common framework for memory hierarchies
Case study of PIV and AMD opteron memory hierarchies

Text Books:
1.   Kai Hwang, "Advanced computer architecture"; TMH. 2000
2.   D. A. Patterson and J. L. Hennessey, "Computer organization and design", Morgan Kaufmann, 2nd Ed. 2002

Reference Books:
1.   J.P.Hayes, "computer Architecture and organization"; MGH. 1998
2.   Harvey G.Cragon,"Memory System and Pipelined processors"; Narosa Publication. 1998
3.   V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI. 2002
4.   R.K.Ghose, Rajan Moona & Phalguni Gupta, "Foundation of Parallel Processing", Narosa Publications, 2003
5.   Kai Hwang and Zu, "Scalable Parallel Computers Architecture", MGH. 2001
6.   Stalling W, "Computer Organisation & Architecture", PHI. 2000
7.   D.Sima, T.Fountain, P.Kasuk, "Advanced Computer Architecture-A Design space Approach,"Addison Wesley,1997.
8.   M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing. 1998
9.   D.A.Patterson, J.L.Hennessy, "Computer Architecture :A quantitative approach"; Morgan Kauffmann feb,2002.
10.   Hwan and Briggs, " Computer Architecture and Parallel Processing"; MGH. 1999

Paper Code: IT-406   **L:3 T/P:1 C:4**
Paper ID: 15406   **Paper: Control Systems**

Unit I
Definitions of Control Systems, Closed Loop and Open Loop Control, Examples of Control Systems; Laplace Transformation and Solution of Differential Equations; Concept of Mathematical model, Linear and Non-Linear Systems, Transfer Function with Simple Examples; Deriving transfer function of physical systems (Mechanical Translational Systems), Armature controlled and field controlled DC servomotors; AC servomotors and deriving their transfer functions; Block Diagram representation and Simplification.

Unit II
Signal Flow graph, Mason gain formula; Basic Control Actions: Proportional, integral and Derivative controllers, effect of feedback on control system; Transient and steady state response of first order system; Second order system, transient; Routh's Stability criterion, relative stability analysis; Static error co-efficients, position, velocity and acceleration error co-efficients.

Unit III
Root Locus Tecniques Bode Diagram, Minimum and Non-Minimum phase systems; Determination of Transfer from Bode Diagram; Polar Plots; Nyquist Plot; Stability Analysis using; Constant M & N Loci.

Unit IV
Introduction to Compensators; Definitions of state, state variables, state space, representation of systems; Solution of time invariant, homogeneous state equation, state transition matrix and its properties; Z transform and solution of different equation; Transducers, synchro-transmitter; Stepper Motor, Tachogenerators; Rotating Amplifiers and Magnetic Amplifiers.

Text Books:
1. Ogata, "Modern Control Engineering" EEE, 4th Edition.
2. B. C. Kuo, "Automatic Control Systems" PHI – 7th Edition.

References:
1. D. R. Choudhary, " Modern Control Engineering", PHI, 2005.
2. I. J. Nagrath, M. Gopal, "Control System Engineering" New Age International, 2000.
3. N. K. Jain, "Automatic Control System Engineering" Dhanpat Rai, 2nd Edition.
4. Les Fenical, "Control Systems", Cenage Learning, 2008

Paper Code: IT-408   **L:3 T/P:1 C:4**
Paper ID: 15408   **Paper: Advanced Database Management Systems**
SKILL DEVELOPMENT & EMPLOYABILITY

Unit-I
Relational Databases
Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Muiltivalued and Join Dependency, Normal Forms, Rules about functional dependencies.
Unit-II
Query Processing and Optimization
Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.
Objected Oriented and Object Relational Databases
Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases
Unit-III
Parallel and Distributed Databases
Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation.
Advanced Transaction Processing
Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.
Unit-IV
Data Mining
Knowledge Representation Using Rules, Association and Classification Rules, Sequential Patterns, Algorithms for Rule Discovery
Data Warehousing
Data Warehousing Architecture, Multidimensional Data Model, Update Propagation
Case Study: Oracle Xi
Text Books:
1. Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007
2. Garcia, Ullman, Widom, "Database Systems, The complete book", Pearson Education, 2007
3. R. Ramakrishnan, "Database Management Systems", McGraw Hill International Editions, 1998
References:
1. Date, Kannan, Swaminathan, "An Introduction to Database Systems", 8th Edition Pearson Education, 2007
2. Singh S.K., "Database System Concepts, design and application", Pearson Education, 2006.
3. Silberscatz, Korth, Sudarshan, "Database System Concepts", Mcgraw Hill, 6th Edition, 2006
4. W. Kim, "Modern Database Systems", 1995, ACM Press, Addision – Wesley,
5. D. Maier, "The Theory of Relational Databases", 1993, Computer Science Press, Rokville, Maryland
6. Ullman, J. D., "Principals of database systems", Galgotia publications, 1999
7. Oracle Xi Reference Manual
8. Dietrich, and Urban, "An Advanced Course in Database Systems", Pearson, 2008.

Paper Code: IT-414   **L:3 T/P:1 C:4**
Paper ID: 1514   Paper: Windows .Net Framework & C# programming

Unit -1 : Introduction to Three-Tier Architecture, overview of .NET Framework , Common Language Runtime (CLR) , The .NET Framework Class Library , familiarization with visual studio .NET IDE , Design Window, Code Window, Server , Explorer, Toolbox, Docking Windows, Properties Explorer, Solution Explorer, Object Browser, Dynamic Help, Task List Explorer, Features of VS.NET, XML Editor, Creating a Project, Add Reference, Build the Project, Debugging a Project

Unit II : Introducing C# Programming , introduction, basic language constructs, types (reference and value, relations between types) , delegates, generics, collections, strings , exceptions, threads , Networking

Unit III : Windows Forms, Adding Controls, Adding an Event Handler, Adding Controls at Runtime
Attaching an Event Handler at Runtime, Writing a Simple Text Editor, Creating a Menu Adding a New Form, Creating a Multiple Document Interface, Creating a Dialog Form Using Form Inheritance, Adding a Tab-Control, Anchoring Controls, Changing the Startup Form, Connecting the dialog, Using ListView and TreeView controls, Building an ImageList and add them to the ListView, Using details inside the ListView, Attaching a Context Menu, Adding a TreeView, Implementing Drag and Drop, Creating Controls at run time, Creating a User Control, Adding a Property, Adding Functionality, Writing a Custom Control, Testing the Control.

Unit IV: ADO.NET Architecture, Understanding the ConnectionObject, Building the Connection String, Understanding the CommandObject, Understanding DataReaders,Understanding DataSets and DataAdapters, DataTable, DataColumn, DataRow, Differences between DataReader Model and DataSet Model, Understanding the DataViewObject, Working with System.Data.OleDb, Using DataReaders, Using DataSets, Working with SQL.NET, Using Stored Procedures, Working with Odbc.NET, Using DSN Connection , Introducing the ASP.NET Architecture, ASP.NET Server Controls, Working with User, Controls, Custom Controls, Understanding the Web.config File, Using the Global.asax Page

Text book and References :

1. "Programming C#, 3rd Edition " Jesse Liberty , O'really
2. C# for Programmers, Deitel and Deitel, Pearson
3 . "Understanding .NET", Chappell, David, , Addison Wesley, 2006

UNIT – I
Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling.

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling, Performance Analysis: Admission control and handoffs

UNIT – II
2.5/3G Mobile Wireless systems: packet switched Data
Introduction, 3G CDMA cellular standards, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G. 2.5/3G TDMA: General Packet Radio Services (GRPS) and EDGE.

UNIT – III
Access Scheduling techniques in cellular systems
Slotted Aloha access, integrated access: voice and data, scheduling in packet based cellular systems.
Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

UNIT – IV
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.

TEXT BOOKS:
1. Yi-Bing and Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons, 2001.
2. Raj Pandya, "Mobile and Personal Communication Systems and Services", PHI, 2001
3. Mischa Schwartz, "Mobile Wireless Communications", Cambridge University Press, UK, 2005.

REFERENCES:
1. Mark Ciampa, "Guide to Designing and Implementing wireless LANs", Thomson learning, Vikas Publishing House, 2001.
2. Ray Rischpater, "Wireless Web Development", Springer Publishing, 2000.
3. Sandeep Singhal, "The Wireless Application Protocol", Pearson Education Asia, 2000.
4. P. Stavronlakis, "Third Generation Mobile Telecommunication systems", Springer Publishers, 2001

Paper Code: IT-418   **L:3 T/P:1 C:4**
Paper ID: 15418   **Paper: Semantic Web**

Unit 1 : Structured Web Documents in XML
1 Introduction , The Semantic Web Vision , Today's Web, From Today's Web to the Semantic Web Layered approach to Semantic Web Technologies , Overview of Structured Web Documents in XML , XML Language Overview , Structuring ,Namespaces , Addressing and Querying XML Documents , Processing of documents.

Unit 2: Describing Web Resources in RDF Understanding content: Metadata, metadata standards, XML+metadata specification, RDFBasics , XML-Based Syntax , RDF Schema: Direct Inference System for RDF , Querying in RQL

Unit 3: Web Ontology Language: , Web Ontology Language, OWL , Future Extensions , case study of any one ontology editor i.e Sesame or Protege, Monotonic Rules syntax and Semantics , Nonmonotonic Rules syntax and semantics .

Unit 4: Applications Semantic Applications,demonstrating power of semantic technology for search, personalization, contextual directory and custom/enterprise applications; next generation semantic content management , Contributions of IR, AI, Logic, NLP, DB and IS to Semantic Web, Ontology integration versus interoperation

Text Books:

> 1. Grigoris Antoniou and Frank van Harmelen, A Semantic Web Primer , The MIT Press 2. Daconta, Obrst and Smith , The Semantic Web: A Guide to the Future of XML, Web Services and Knowledge Management. Wiley 2003.

References :

1. Munindar P. Singh and Michael N. Huhns, Service-Oriented Computing, Wiley & Sons.
2. Thomas Erl , Service-Oriented Architecture (SOA): Concepts, Technology, and Design , Prentice Hall

Table 1: Course Outcomes for Under Graduate Programmes of Studies (Compulsory evaluator courses).

Sr.No.	Paper Code	Paper Name	Course Outcomes
1.	HS101	Communication Skills-I	1. Ability to use tenses and concord; gerunds, participles & infinitives correctly. 2. Ability to use antonyms and synonyms, idioms and foreign phrases correctly. 3. Ability to compose simple technical reports. 4. Ability to present a logical argument.
2.	BA103	Chemistry – I	1. Ability to understand the properties of water. 2. Understand different types of fuels and make simple calorimetric calculations. 3. Understand characteristic properties of polymers. 4. Understand different types of corrosive mechanisms and its prevention.
3.	IT 105	Introduction to Computers	1. Ability to use computers for word processing, spreadsheet calculation, use operating system commands and understand basic structure of a computing system. 2. Ability to describe an algorithm. 3. Ability to write programs in 'C' using functions, arrays, structure, files etc.
4.	IT 107	Electrical Science	1. Ability to analyse simple DC circuit problems. 2. Ability to analyse simple AC Circuits. 3. Understand the working of transformers and electrical measurement devices. 4. Understand the working of DC and AC motors.
5.	BA109	Mathematics – I	1. Ability to solve problems using differential and integral calculus. 2. Ability to analyse convergence of series with emphasis of Taylor's and Maclaurin series. 3. Ability to solve differential and integral problems of many variables. 5. Ability to solve problems of vector calculus.
6.	BA111	Physics – I	1. Understanding of wave optics (Polarization, Interference and Diffraction). 2. Understand working of different types of lasers. 3. Understand principles and working optical fibres. 1. Understand and be able to solve problems in special theory of relativity.
7.	HS102	Communication Skills – II	1. Understand the medium of communication. 2. Ability to write technical reports and business letters. 3. Ability to speak with clarity and fluency. 4. Ability to participate in a group discussion and have effective listening capability.

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Sr.No.	Paper Code	Paper Name	Course Outcomes
8.	IT104	Engineering Mechanics	1. Ability to solve problems pertaining to force systems, equilibrium and distributed systems. 2. Ability to solve problems of friction and engineering trusses. 3. Ability to deal with the problems of kinematics and kinetics of particle 4. Ability to deal with the problems of kinematics and kinetics of rigid bodies.
9.	BA108	Mathematics – II	1. Ability to use linear algebraic techniques to solve problems. 2. Ability to use ODE techniques to solve problems. 3. Ability to use complex analysis techniques to solve problems. 4. Ability to use probabilistic techniques to solve problems.
10.	BA110	Physics-II	1. Understand quantum mechanical systems and solve simple problems. 2. Understand quantum statistical systems and solve simple problems. 3. Understand and use band theory of solids to explain working of diodes and transistors. 4. Understand how planar EM waves are generated.
11.	BA114	Statistics Theory of Probability and Linear Programming	1. Understand the concept of random variates (discrete and continuous). 2. Ability to calculate moments and their usage for calculation of skewness and kurtosis measures. 3. Ability to do data analysis using linear regression. And to use tests of hypothesis. 4. Ability to solve simple linear programming problems using the simplex methods and problems of transportation and assignment.
12.	BA118	Chemistry-II	1. Understand atomic structure and electron shell structure. 2. Understand different type of bonding mechanisms and structures. 3. Ability to do thermo-chemistry and reaction kinetic calculations. 4. Understand electron chemistry, catalysis phenomena and the phase rule.

Sr.No.	Paper Code	Paper Name	Course Outcomes
13.	IT128	Data Structures	1. Able to understand the concepts of data structure such as stacks, queues, linked list and their applications. 2. Implement Binary Search Trees, Max/Min-Heaps and understand the basic concepts of self-balancing Binary Search Trees such as AVL trees. 3. Able to understand the concept of multi-way trees (B-Tree, B+ Tree and B* Tree) and Graphs representation, traversal and their applications. 4. Able to analyse various Sorting (Selection, Insertion, Exchange and Merging), Searching algorithms (Sequential, Binary and Hashing) and determine their time complexity.
14.	BA156	Physics– II Lab	The CO of lab is same as the corresponding theory code i.e. BA110
15.	BA162	Chemistry– II Lab	The CO of lab is same as the corresponding theory code i.e. BA118
Second Year			
16.	IT201	Computational Methods / Computational techniques	1. Ability to find roots of equations. Solve unconstrained one variable minimization problems, and multi-variate minimization problems. 2. Ability to perform numerical interpolation, differentiation and integration. 3. Ability to solve linear equations numerically and to approximate functions using splines. 4. Ability to solve differential equations numerically.
17.	IT203	Circuits and Systems	1. Understand the classification and properties of signals and systems. 2. Ability to use Fourier series, Fourier Transforms and Laplace transforms to analyse continuous systems while for discrete systems have ability to use Discrete Fourier Series, Discrete Time Fourier Transform and Z- Transform. 3. Ability to analyse electrical networks with DC sources and the theorems and transformations (source and circuits) associated. 4. Ability to analyse electrical networks with AC sources and the theorems and transformations (source and circuits) associated.

Sr.No.	Paper Code	Paper Name	Course Outcomes
18.	IT205	Electronic Devices and Circuits	1. Ability to analyse PN junctions in semiconductor devices under various conditions. 2. Ability to design and analyse simple rectifiers and voltage regulators using diodes. 3. Ability to describe the behavior of special purpose diodes. 4. Ability to design and analyse simple BJT and MOSFET circuits.
19.	IT207	Object Oriented Programming Using C++	1. Ability to describe the important concepts of object oriented programming like object and class, Encapsulation, inheritance and polymorphism. 2. Ability to write the simple object oriented programs in C++, use features of C++ like type conversion, inheritance, polymorphism, I/O streams and files to develop programs for real life problems. 3. Ability to use advance features like templates and exception to make programs supporting reusability and sophistication. 4. Ability to use standard template library for faster development. 5. Ability to develop applications using object oriented programming with C++.
20.	IT209	Computer Graphics	1. Understand the basic computer graphics primitives as well as able to implement them. 2. Ability to apply various transformation techniques. 3. Ability to implement surface and edge detection and hidden edge and surface removal, shading techniques and illumination techniques. 4. Ability to implement procedural modals, fractals, grammar based models, multi-particle systems and volume rendering.
21.	IT211	Database Management Systems	1. Ability to identify and define the information that is needed to design a database management system for a business information problem. 2. Ability to create conceptual and logical database designs for a business information problem. 3. Ability to build a database management system that satisfies relational theory and provides users with business queries. 4. Understand the core terms, concepts, and tools of relational database management systems. 5. Ability to create, maintain and query databases and tables.

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Sr.No.	Paper Code	Paper Name	Course Outcomes
22.	IT202	Java Programming	1. Understand and gain knowledge of characteristics of java, its compilation, JVM as an emulator, instruction set, control flow, programming and the sandbox model. 2. Learn the fundamentals of java programming and will apply the knowledge of exceptional handling in writing the program. Clearly understand the concepts like wrapper classes inheritance. 3. Have sufficient knowledge about threads & thread synchronization and will thoroughly understand the AWT components and event handling mechanism. 4. Have a clear understanding of concepts of I/O streams, IDBC, object serialization, sockets, RMI, JNI, Collection API interfaces, Vector, Stack, Hash table classes, list etc
23.	IT204	Multimedia Applications	1. Understand multimedia streams, systems, storage and H/W/ and S/W requirements. 2. Understand audio, video, text and animation techniques and their amalgamation to create a multimedia system. 3. Understand lossy and lossless compression techniques. 4. Ability to use Maya to create multi-media applications.
24.	IT206	Switching Theory and Logic Design	1. Ability to understand, represent and minimize Boolean Expression for digital circuits. 2. Ability to design circuits for multiplexers, demultiplexers, decoders and encoders, adders and subtractors, code convertors and comparators. 3. Understand the working and design of flip-flops, shift registers, ripple counters, synchronous counters and sequence detectors. 4. Understand the working of 555 timer and its use as mono-stable and astable multi-vibrator. 5. Understand different logic families and their characteristics along with the knowledge of different types of memories.
25.	MS208	Organization Behaviour	1. Have an understanding of management principles and processes. 2. Have an understanding of the organizational structure and processes 3. Understand the behavioural dynamics in an organization. 4. Understand how decisions are made in an organization.

Sr.No.	Paper Code	Paper Name	Course Outcomes
26.	IT210	Foundations of Computer Science	1. Ability to use formal logic to present a mathematical proof. Ability to perform deductive as well as inductive proofs. 2. Understand the properties and usage of the mathematical structures and principles: Sets, operations on sets, counting principles (combinatorics), relations and functions. 3. Understand lattices and Boolean algebra. And, also the properties of recurrence relations and growth of functions for analysis of algorithms. 4. Understand elementary number theory and its applications. 5. Understand the properties of the graph structures and the algorithms defined on the graph structure like spanning tree, minimal path etc.
27.	IT212	Software Engineering	1. Ability to differentiate between various Software Development Life Cycle (SDLC) Models and Requirement elicitation. 2. Ability to define, formulate and analyse a problem. 3. Ability to analyse, design, verify, validate, software systems. 4. Ability to construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain.
Third Year			
28.	IT305	Computer Architecture	1. Ability to identify various components of computer and their interconnection and identify basic components and design of the CPU: the ALU and control unit. 2. Ability to compare and select various Memory devices as per requirement. 3. Ability to compare various types of IO mapping techniques 4. Ability to critique the performance issues of cache memory and virtual memory and I/O organization
29.	IT307	Digital Signal Processing	1. Ability to analyse Continuous and Discrete time signals/systems and evaluate the frequency response of a discrete time signals/ systems using fourier transforms. 2. Ability to calculate Z-transforms for discrete time signals and system functions. 3. Ability to develop Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems. 4. Ability to understand the design of Digital IIR filters and Digital FIR filter.

Sr.No.	Paper Code	Paper Name	Course Outcomes
30.	IT309	Object Oriented Software Engineering	1. Ability to identify requirements, analyze and prepare models. 2. Ability to select a suitable architecture for the project. Also plan, schedule and track the progress of the project. 3. Ability to design and develop software project and understand the maintenance concept of object oriented systems. 4. Ability to apply testing principles on object oriented software project and understand the methods to determine reliability in software.
31.	IT313	Communication Systems	1. Understand the working and characteristics of linear systems. 2. Understand the working and design of amplitude modulation and demodulation systems. 3. Understand the working and design of digital communications systems. 4. Understand the limitations and the capability of a communication system from the perspective of information theory
32.	IT315	Linux and Win32 Programming	1. Understand linux system architecture, commands and system calls. 2. Ability to write system calls to write programs. 3. Understand Win32 architecture and programming model. 4. Ability to write event driven programs on the Win32 platform.
33.	IT317	Operating Systems	1. Understand OS types, and process management techniques. 2. Understand CPU scheduling and process synchronization techniques. 3. Understand Primary and Secondary memory management techniques. 4. Understand techniques for file system management and system security and protection.
34.	IT302	Microprocessors	1. Understand evolutional history of microprocessors from Intel. 2. Understand Intel 8086 architecture. 3. Ability to program the Intel 8086 processor in assembly language. 4. Ability to interface 8086 with semiconductor memory and other micro-controllers.

Sr.No.	Paper Code	Paper Name	Course Outcomes
35.	IT304	Computer Networks	1. Understand the concepts of computer networks, OSI model and TCP/IP model. 2. Understand the physical layer concepts and signal encoding/decoding techniques. 3. Understand the data link layer functions and protocols. 4. Understand standards for LAN / WAN technologies and concepts of network layer.
36.	IT306	Algorithm Analysis and Design	1. Ability to understand time complexity and disjoint sets. 2. Ability to differentiate between dynamic programming and greedy programming methodologies. 3. Have a knowledge of graphs and applications of graphs. 4. Have basic knowledge of string matching and NP complete problems using few examples of NP complete problems
37.	IT 314	Digital System Design	1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics. 2. To understand and examine the structure of various number systems and its application in digital design. 3. The ability to understand, analyze and design various combinational and sequential circuits. 4. Ability to identify basic requirements for a design application and propose a cost effective solution.
38.	IT316	Digital Communications	1. Understand the principles and practices of Pulse modulation. 2. Understand baseband pulse transmission techniques. 3. Understand passband data transmission techniques. 4. Understand principles of error control coding and spread spectrum modulation. 5. Ability to design a digital communication system.
Fourth Year			
39.	IT401	Advanced Computer Networks	1. Understand network layer and routing protocols. 2. Understand network address resolution protocols and IPV6. Understand transport layer protocols. 3. Understand different application layer protocols. 4. Understand security issues and protection methods in TCP/IP. 5. Ability to design and implement a computer network

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Sr.No.	Paper Code	Paper Name	Course Outcomes
40.	IT413	Front End Design Tools and Web Technologies	1. Ability to design a website using HTML, CSS and Javascript. 2. Ability to use XML, Java Beans and EJB for development of websites. 3. Ability to use servlets, configure webservers and use JSP. 4. Ability to use database systems for development of interactive websites.
41.	IT403	Software Testing	1. Ability to describe the basic taxonomy, key techniques and its limitation in software testing. 2. Ability to produce and execute test cases at various levels of testing using different problem solving techniques. 3. Ability to practice several object oriented testing methods and web application testing approaches. 5. Ability to express how to lower the time and cost of software testing while increasing the software quality.
42.	IT-405	Distributed Systems	1. Understand the design principles in distributed systems and the architectures for distributed systems. 2. Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting etc. 3. Analyze fault tolerance and recovery in distributed systems and algorithms for the same. 4. Analyze the design and functioning of existing distributed systems and file systems.
43.	IT-415	Advanced Java Programming	1. learn to access database through Java programs, using JDBC and invoke the remote methods in an application using RMI 2. Gain the knowledge of Server Side programing by implementing Servlet and JSP 3. Understand structs framework, Combining Struts and Tile to create small applications 4. Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
44.	IT-417	Embedded System Design	1. To introduce the Building Blocks of Embedded System 2. To Educate in Various Embedded Development Strategies 3. To Introduce Bus Communication in processors, Input/output interfacing. 4. To impart knowledge in various processor scheduling algorithms and to introduce Basics of Real time operating system and example tutorials to discuss on one real time operating system tool.

Sr.No.	Paper Code	Paper Name	Course Outcomes
45.	IT-419	Wireless & Mobile Communication	1. Demonstrate knowledge on cellular concepts like frequency reuse, fading, equalization, GSM ,CDMA 2. Demonstrate knowledge on hand-off and infertace and apply the concept to calculate link budget using path loss model 3. Demonstrate knowledge on equalization and different diversity techniques. 4. Compare different multiple access techniques in mobile communication.
46.	IT-421	Data warehousing & Mining	1. Understand the concepts of data warehousing and data mining and discuss the overall architecture of data warehouse system 2. learn and apply the concepts of multidimensional modeling 3. introduce the techniques and methods for data gathering, data pre-processing and data warehouse implementation 4. learn different data mining techniques and develop and apply critical thinking, problem-solving and decision-making skills for further research in various application area
47.	HS-402	Technical Writing	1. Develop effective research paper writing skills which has good level of readability in scientific community. 2. Learn to Structure Research Papers 3. Understand the skills needed when writing scientific descriptions 4. Ensure about the ethics and etiquettes of work culture
48.	IT-404	Advanced Computer Architecture	1. Ability of students to understand concept of parallel computing and hardware technologies. 2. Ability of students to differnciate control flow, data flow, demand driven mechanisms. 3. Ability of students to understand the principles of scalable performance, and advanced processor architectures. 4. Ability of students to the basics of instruction pipelining and memory technologies.

Sr.No.	Paper Code	Paper Name	Course Outcomes
49.	IT-406	Control Systems	1. Familiarization with various components and building blocks of a control system and their transfer function in open loop as well as closed loop configurations. 2. Time domain analysis (Transient as well as steady state) as also knowledge of error constant. 3. Frequency Domain Analysis, specifications and graphical methods to study stability of the system in terms of its parameters/variables. 4. Algebraic and graphical techniques to analysis various systems for stable operation. Concept of controllers and compensation methods to achieve desirable performance of the system.
50.	IT-408	Advanced Database Management Systems	1. To be able to understand the advanced concepts of relational database systems 2. To be able to have in-depth knowledge of query processing and transaction processing. 3. To have knowledge of other types of databases like Parallel, Distributed and object oriented 4. To have basic knowledge of data warehousing and data mining.
51.	IT-414	Windows .Net Framework & C# programming	1. understand .NET Framework , Common Language Runtime (CLR) and familiarization with visualstudio .NET IDE 2.build applications on .NET platform by understanding the syntax and semantics of C# 3. develop dynamic web applications, create and consume web services 4. use appropriate data sources and data bindings in .NET web applications

52.	IT-416	Mobile Computing	1. Ability of students to understand the fundamentals of Mobile Computing. 2. Ability of students to understand generation of Mobile networks : 1G to 5G 3. Ability of students to understand Low Range Mobile Computing Networks 4. Ability of students to understand Use Cases of Mobile Computing : Smart Devices
53.	IT-418	Semantic Web	1. Ability of students to understand the basic concepts of web, its technologies and development. 2. Ability of students to understand the Semantic Web fundamental concepts, issues, architecture and technologies. 3. Ability of students to understand the various technologies of Semantic Web focusing on RDF, Ontology and Sparql. 4. Ability of students to understand the latest trends and applications of Semantic Web.

Guidelines for B.Tech IT (Labs based on Theory Papers).

Semester 1:
Paper Code: BA 151
Subject: Chemistry – I Lab
This Lab Course will be based on Chemistry I. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: BA 153
Subject: Physics – I Lab
This Lab Course will be based on Physics I. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT155
Subject: Computer Lab
This Lab Course will be based on Introduction to Computers (IT 105). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT 157
Subject: Engineering Graphics - I
This Lab Course will be based on Engineering Graphics. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper so that every student has the ability to project points and lines on reference planes, ability to project on planes other than reference planes, ability to project plane figures, ability to project of solids, sections and surfaces.

Paper Code: IT159
Subject: Computer Lab
This Lab Course will be based on Electrical Science Lab. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Semester 2:

Paper Code: IT152
Subject: Data Structure Lab
This Lab Course will be based on Data Structures (IT 128). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: BA 156
Subject: Physics – II Lab
This Lab Course will be based on Physics II. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: BA 162
Subject: Chemistry – II Lab
This Lab Course will be based on Chemistry II. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: BA 154
Subject: Engineering Graphics - II
This Lab Course will be based on Engineering Graphics. The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper so that every student has the ability to perspective, orthographic, isometric and oblique projections, ability to sketch and describe shapes using techniques of 1st and 3rd angle projections, glass-box concept, Ability to describe size (dimensioning) and Elementary understanding of CAD.

Semester 3:

Paper Code: IT251
Subject: Electronic Devices and Circuits Lab.
This Lab Course will be based on Electronic Devices and Circuits (IT 205). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT253
Subject: Computation Lab.
This Lab Course will be based on Computational Methods (IT 201). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT255
Subject: Object Oriented Programming Lab.
This Lab Course will be based on Object Oriented Programming Using C++ (IT 207). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten

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practicals have to be performed by the students studying for this paper.

Paper Code: IT257
Subject: Computer Graphics Lab.
This Lab Course will be based on Computer Graphics (IT 209). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT259
Subject: DBMS Lab.
This Lab Course will be based on Database Management Systems (IT 211). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Semester 4:

Paper Code: IT252
Subject: Java Programming Lab.
This Lab Course will be based on Java Programming (IT 202). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT254
Subject: Multimedia Lab.
This Lab Course will be based on Multimedia Applications (IT 204). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT256
Subject: Switching Theory and Logic Design Lab.
This Lab Course will be based on Switching Theory and Logic Design (IT 206). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT258
Subject: Software Engineering Lab.

This Lab Course will be based on Software Engineering (IT 212). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Semester 5:

Paper Code: IT353
Subject: Digital Signal Processing Lab.

This Lab Course will be based on Digital Signal Processing (IT 307). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT359
Subject: Object Oriented Software Engineering Lab.

This Lab Course will be based on Object Oriented Software Engineering (IT 309). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT361
Subject: Linux and Win32 Programming Lab.
This Lab Course will be based on Linux and Win32 Programming (IT 315). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT357
Subject: Summer Training (Conducted at the end of the 4thSemester) Report, Seminar and Viva - Voce

Students will undergo summer training/industry visit/In-house training/In-house project during the summer break after the completion of sixth semester. Report of the same is required to be submitted to the school. Viva-voce examination will be conducted based on the report submitted by the student. A panel of examiner will be appointed by the Dean, USIT.

Semester 6:

Paper Code: IT352
Subject: Microprocessor Lab.
This Lab Course will be based on Microprocessors (IT 302). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT354
Subject: Algorithm Analysis & Design Lab.
This Lab Course will be based on Algorithm Analysis & Design (IT 306). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT360
Subject: DSD Lab.
This Lab Course will be based on Digital System Design(IT 314). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT362
Subject: Digital Communication Lab.
This Lab Course will be based on Digital Communication (IT 316). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Semester 7:

Paper Code: IT451
Subject: ACN Lab.
This Lab Course will be based on Advanced Computer Networks (IT 401). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT453
Subject: FEDT & Web Technology Lab.
This Lab Course will be based on Front End Design Tools and Web Technologies (IT 413). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT455
Subject: Laboratory work for electives
This Lab Course will be based on the electives chosen by then students. The concerned teacher

shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

Paper Code: IT457
Subject: Minor Project
This course is corresponding to the minor project that students have to complete in seventh semester.

Paper Code: IT459
Subject: Summer Training (Conducted at the end of the 6th Semester) Report, Seminar and Viva - Voce

Students will undergo summer training/industry visit/In-house training/In-house project during the summer break after the completion of sixth semester. Report of the same is required to be submitted to the school. Viva-voce examination will be conducted based on the report submitted by the student. A panel of examiner will be appointed by the Dean, USIT.

Semester 8:

Paper Code: IT452
Subject: Major Project (Report)
This course is corresponding to the major project that students have to complete in the eighth semester. Report of the same is required to be submitted by the student.

Paper Code: IT454
Subject: Viva – Voce (On major project)
Viva-voce examination will be conducted based on the report of the major project submitted by the student,

Paper Code: IT456
Subject: Seminar and progress report
This paper will be based on project work (IT-452). Seminar will be held in the school for the purpose of evaluation of the progress of the project work.

Paper Code: IT458
Subject: Laboratory Assignments
This Lab Course will be based on This lab will be based on elective paper(s). The concerned teacher shall announce the list of practicals in the first week of teaching. Atleast ten practicals have to be performed by the students studying for this paper.

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