GOA UNIVERSITY

THIRD YEAR OF BACHELOR'S DEGREE COURSE IN INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXMINATION (Revised in 2007-08)

SEMESTER V

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 5.1	Introduction to Data Communication	3	1	0	3	100	20 + 5	-	-	125
IT 5.2	Digital Signal Processing	3	1	0	3	100	20 + 5	-	-	125
IT 5.3	Software Engineering	3	1	2	3	100	20 + 5	-	-	125
IT 5.4	Intelligent Agents	3	1	2	3	100	20 + 5	-	-	125
IT 5.5	Operating Systems	3	1	2	3	100	20 + 5	50	-	175
IT 5.6	Database Management Systems	3	1	2	3	100	20 + 5	50	-	175
	TOTAL	18	06	08	-	600	150	100	-	850

L- Lectures, T- Tutorials, P- Practicals,
Th-.Dur.- Duration of Theory paper, Th-Theory, S-Sessional, O-Oral.
25 Sessional marks will be split as follows: 20 marks are for the Internal Test,
5 marks are for continuous evaluation of Practicals/Assignments

SEMESTER VI

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 6.1	Entrepreneurship Development	3	0	0	3	100	20 + 5	-	-	125
IT 6.2	Theory of Computation	3	0	2	3	100	20 + 5	-	-	125
IT 6.3	Computer Networks	3	1	2	3	100	20 + 5	-	-	125
IT 6.4	Computer Graphics	3	1	2	3	100	20 + 5	50	-	175
IT 6.5	Web Technology	3	1	2	3	100	20 + 5	50	-	175
IT 6.6	Software Testing & Quality Assurance	3	1	2	3	100	20 + 5	-	-	125
	TOTAL	18	04	10	-	600	150	100	-	850

L- Lectures, T- Tutorials, P- Practicals,

Th-.Dur.- Duration of Theory paper, Th-Theory, S-Sessional, O-Oral.

25 Sessional marks will be split as follows: 20 marks are for the Internal Test,
5 marks are for continuous evaluation of Practicals/Assignments

IT 5.1IDC INTRODUCTION TO DATA COMMUNICATION

Lecture Per week : (3+ 1+ 0)

Max Marks for Theory paper : 100

Max marks for sessionals : 20 + 5

Duration of Paper : 3 hours

Total Number of Modules : 4

Number of Questions from Each Module : 2 (Each question shall carry 20marks)

Total Number of Questions to be answered : 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives:

To learn and understand fundamentals of data communications.

To understand the conceptual and analytical differences between analog and digital communication.

To understand a conceptual foundation for the study of data communications using the open system interconnection (OSI) layered architecture model..

Review Current events in the field of communications so that the student has a sound working knowledge in today's competitive environment.

Have a clear idea how data could transfer between senders and receivers either wired or wireless.

Instructional Objectives:

After completing this course student shall

- Know the basic concepts of networking.
- Know different network topologies and their advantages and disadvantages.
- Know how to build a network model and why.
- Understand how data could be encoded to digital bits.
- Identify different types of Transmission Mediums.
- Recognize the network layers and their main jobs.
- Apply and differentiate between different error detection and correction methods

MODULE I

Introduction of data communication, Overview, communications model, components, Networks-distributed processing. Protocol architecture : needs, OSI Model(Functions), TCP/IP Model(Functions),Protocols and standards. (3 Hrs)

Basic concepts of data communication, Line configuration, Topology, Transmission modes, Categories of networks, Inter networks. (3 Hrs)

Transmission media: Guided Media – Twisted–pair cable, Coaxial cable and Optical fiber. Unguided Media – Wireless Communication, Terrestrial microwave, satellite

communication and cellular telephony. (3 Hrs)

Shannon's Theorem, Comparison of different Media, Transmission Impairments - Distortion, Attenuation and noise. Performance. (3 Hrs)

MODULE II

Data Encoding: Digital data digital signals : Unipolar, polar, Bipolar. Analog data Analog signals : AM, FM, PM. Digital data analog signals: ASK, FSK, PSK. Analog data digital signals: PAM, PCM (4Hrs)

Data communication interface: Physical Layer. Digital Data transmission: Asynchronous and synchronous transmission. DTE-DCE interface, Modems-56k,cable modem. Interfacing: V.24/EIA 232-F, ISDN Physical Interface (5 Hrs)

Spread Spectrum: Concept, FHSS, DSSS, CDMA (2 Hrs)

MODULE III

Data Link Layer: Flow Control – Stop and Wait Flow Control, Sliding Window Error Detection: Types of errors, Detection Methods, Parity Check, VRC, LRC,CRC using modulo-2, Polynomials (CRC-16, CRC-32),Checksum. Error Correction: Hamming Code. Error Control – Stop and Wait ARQ, Go-Back-NARQ and Selective-Reject ARQ . (6 Hrs)

Data Link Protocols Asynchronous Protocols, Synchronous Protocols. Character Oriented Protocols – BSC. Bit-Oriented Protocols- HDLC, Configuration, Types of frames and Modes of Communication, operation. Switching: Packet Switching, Circuit Switching and Message Switching. (5 Hrs)

MODULE IV

Local Area Networks: Introduction, Topologies (Bus, Ring, Star, Tree) and transmission media. LAN Protocol Architecture : LLC(Logical Link Control), Medium Access Control (MAC) (3 Hrs)

Introduction to Networking and Internetworking devices. Repeaters, Routers, Gateways, Bridges: Functions, Protocol Architecture and Spanning Tree Approach. Wireless LANs: Technology, Requirements, Wireless LAN applications. (5 Hrs)

High Speed LANs: Emergence, Ethernet, Token Ring, Fiber channel. (2 Hrs)

Case Study: Introduction to Blue tooth (In brief) (1 Hr)

TEXT BOOKS:

1. Data and Computer Communication - William Stallings. Seventh edition.
2. Data Communication and Networking – B.A. Forouzan, Tata McGraw Hill

REFERENCE BOOKS:

1. Computer Networks – Andrew Tanenbaum
2. Computer Networks and Internets -Douglas Comer
3. Design and Analysis of Computer Communication Networks – V. Ahuja, McGraw Hill

IT 5.2DSP DIGITAL SIGNAL PROCESSING

Lecture Per week	: (3+ 1+ 0)
Max Marks for Theory paper	: 100
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives:

- To learn methodology to analyze signals and systems
- To get acquainted with the DSP Processors

Instructional Objectives

At the conclusion of this course, students will be able to:

• Describe the Sampling Theorem and how this relates to Aliasing and Folding.

• Determine if a system is a Linear Time-Invariant (LTI) System.

• Take the Z-transform of a LTI system

• Determine the frequency response of FIR and IIR filters.

• Understand the relationship between poles, zeros, and stability.

• Determine the spectrum of a signal using the DFT, FFT, and spectrogram.

• Design, analyze, and implement digital filters in Matlab

MODULE I

Introduction (3 Hrs)

Digital signal processing and its benefits, Application areas, Key DSP operations, Overview of real-world applications of DSP, Audio applications of DSP, Telecommunication applications of DSP

Analog I/O interface for real-time DSP systems (7 Hrs)

Typical real-time DSP systems, Analog-to-digital conversion process, Sampling – lowpass and bandpass signals, Uniform and non-uniform quantization and encoding, Digital-to-analog conversion process: signal recovery, The DAC. Constraints of real-time signal processing with analog input/output signals. Application examples.

MODULE II

Discrete transforms (4 Hrs)

Introduction. DFT and its inverse. Properties of the DFT. Computational complexity of the DFT. The decimation-in-time fast Fourier transform algorithm. Inverse fast Fourier transforms. Implementation of the FFT. Worked examples.

The z-transform and its applications in signal processing (6 Hrs)

Discrete-time signals and systems. The z-transform. The inverse z-transform. Properties of the z-transform. Some applications of the z-transform in signal processing-Pole-zerodescription of discrete-time systems. Frequency response estimation. Frequency units used in discrete-time systems. Stability consideration. Impulse response estimation. Applications in digital filter design. Realization structures for digital filters.

MODULE III

Correlation and convolution (6 Hrs)

Introduction. Correlation description- cross and autocorrelation. Fast correlation. Convolution description- properties of convolution. circular convolution. System identification. Deconvolution. fast linear convolution, overlap-add method, overlap-save method. The relationship between convolution and correlation. Implementation of correlation and convolution.

A framework for digital filter design (4 Hrs)

Introduction to digital filters. Types of digital filters: FIR and IIR filters. Choosing between. FIR and IIR filters. Filter design steps. Illustrative examples.

MODULE IV

Finite impulse response (FIR) filter design (5 Hrs)

Introduction. FIR filter design. FIR filter specifications. FIR coefficient calculation methods. Window method. Frequency sampling method. Realization structures for FIR filters

Design of infinite impulse response (IIR) digital filters (5 Hrs)

Introduction. Design stages for digital IIR filters. Performance specification. Coefficient calculation methods for IIR filters. Impulse invariant method of coefficient calculation. Bilinear z-transform (BZT) method of coefficient calculation. Use of BZT and classical analog filters to design IIR filters. Realization structures for IIR digital filter

TEXT BOOKS:

1. Digital Signal Processing – A practical approach by Emmanuel C. Ifeachor, Barrie W. Jervis, Pearson Education Limited
2. Introduction to Digital Signal Processing by Johnny Johnson, Prentice –Hall of India Private Limited
3. Digital Signal Processing – Principles, Algorithms and Applications by John G. Proakis, Dimitris G. Manolakis, Prentice –Hall of India Private Limited

REFERENCE BOOKS:

Digital Signal Processing by S. Salivahannan, A Vallavaraj, C Gnanapriya, Tata McGraw Hill Publishing Company Limited

IT 5.3SE SOFTWARE ENGINEERING

Lecture Per week	: (3+ 1+ 2)
Max Marks for Theory paper	: 100
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives:

To learn and understand the concepts of Software Engineering. To apply the Principles of Software Engineering for Software Development. Students will gain experience in software project management; requirements, analysis, and design; procedural maturity;social, ethical, cultural, and safety issues in deployment; interpersonal skills for management and team membership; and the software engineering tact of systems architecture.

Instructional Objectives:

Students who complete this course will feel comfortable in the role of a Software Designer, Software Architect or Project Manager for the development of software to solve business and technical problems. Students become conversant in methodologies, architectural approaches, project management techniques, and team dynamics.

MODULE I

Classical Software Engineering: (9 Hrs)

Introduction to Software Engineering, scope of software engineering: The software process-client, developer and software development life cycle user requirement phase, specification phase, Design phase implementation phase, Integration phase, maintenance phase improving the software process, capability maturity models, costs and benefits of software process management.

Software life cycle models and comparison of all life cycle models. (3Hrs)

MODULE II

Basic design concepts: (3 Hrs)

Cohesion and its various types, coupling and its various types and partitioning.

Effort estimation and scheduling, Cost estimation models- Function point analysis and COCOMO Interoperability- CASE tools in use for object oriented software engineering-UML and its usage in software engineering (6 Hrs)

Software Re-engineering (2 Hrs)

MODULE III

Software testing: (6 Hrs)

software quality assurance, The essentials of software testing, clean sheet approach, verification testing, validation testing , Software testing tools- for classical engineering and object oriented engineering- software testing standards

Integration testing: (5 Hrs)

Master test planning, Organizational approaches to testing object oriented testing, Testing standards

MODULE IV

Software Project management: (8 Hrs)

Managing software project, project planning, process planning- the standard process, requirement change management, quality management, Risk management, the project management plan team structure, communication, scheduling, quality planning, measurement and tracking planning, team programming aspects, software configuration management.

Project execution, project monitoring and control, project closure performing, closure analysis, closure analysis report. (3 Hrs)

TEXT BOOKS:

1. Object Oriented and Classical Software Engineering- Stephen R.Schah (TMH)

2. Software Project Management in practice- Pankaj Jalote- PEA
3. Software Engineering – A practitioner's approach – by Roger S. Pressman, McGraw Hill (6th edition)

REFERENCE BOOKS:

1. A discipline for Software Engineering – by Watts S. Humprey, Pearson Education
2. Software Engineering – by K. K. Aggarwal and Yogesh Singh, New Age Publications
3. 'Ed-Kit'- Software testing in real world. Addison Wesley 1995
4. Effective methods for software testing(second edition) John-Wiley 1999
5. Software testing techniques(2nd edition) Van Nostrand Rein loud 1990
6. The art of software testing, Jon Wiley Mayers G.J.

IT 5.4IA INTELLIGENT AGENTS

Lecture Per week	: (3+ 1+ 0)
Max Marks for Theory paper	: 100
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives

- To understand the concepts of Artificial intelligence
- Learn and Understand the knowledge representation techniques for knowledge base
- To Learn and Understand the fundamentals of Neural Network

Instructional Objective:

At the end of the course the student will be able to analyze a problem which requires intelligent techniques to solve. Student will also learn the knowledge representation and manipulation techniques.

MODULE I

Intelligent agents: environment, properties and structure. Problem solving agents. Searching for solutions. Breadth-first search, Depth-first search, uniform-cost search, Depth-limited and Iterative deepening depth-first search. Heuristic search strategies: Best-first search, memory bounded heuristic search, Hill climbing search and simulated annealing search (8 Hrs)

Constraint Satisfaction problems, backtracking search, propagating information. (2Hrs)

Game Playing, the minimax algorithm, alpha-beta pruning, imperfect-real time decisions, games involving an element of chance. (3 Hrs)

MODULE II

Logical agents, Propositional logic, reasoning in propositional logic. First order predicate logic, Inference in First-order predicate logic. Unification algorithm. Forward chaining, backward chaining. conjunctive normal form for predicate logic. theorem proving by resolution principle. (8 Hrs)

Semantic networks. Reasoning with default information. Truth maintenance system. (4 Hrs)

MODULE III

Planning problem, Planning with state space search, Partial order planning. (4Hrs)

Acting under uncertainty, conditional probability, the axioms of probability, full-joint distribution, independence, Bayes' rule. and its use.. Bayesian (belief) networks. (6Hrs)

The basis of utility theory and utility functions. (2Hrs)

MODULE IV

Forms of learning, inductive learning, learning decision trees. (4Hrs)

Learning in Neural networks. (3 Hrs)

Communication as action, syntactic analysis, augmented grammars, semantic interpretation (5 Hrs)

TEXT BOOKS:

1. Stewart Russel and Peter Norvig. " Artificial Intelligence- A Modern Approach", PHI, 1995
2. Elain Rich and Kevin Knight, "Artificial Intelligence", TMH, second edition. 1993

REFERENCE BOOKS:

1. Nils J Nilsson, :Artificial Intelligence- A new Synthesis", Harcourt Asia PTE Ltd, Morgan Kaufman 1988
2. Eugene Charniak and Drew Mc Dermott, Addison Wesely, "Introduction to Artificial Intelligence", ISE Reprint 1998.

IT 5.5OS OPERATING SYSTEMS

Lecture Per week	: (3+ 1+ 2)
Max Marks for Theory paper	: 100
Max Marks for practical	: 50
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course Objective:

The Operating System is a program that acts as an intermediary between a computer user and the computer hardware. The primary aims of an operating system are resource management, scheduling and access control. This course aims to describe the fundamental concepts behind operating systems, and examine the ways in which its design goals can be achieved.

Instructional Objective:

At the end of the course, the students should know:

1. The fundamental concepts of operating systems, its evolution and various architectures.
2. The terminologies associated with operating system concepts such as processes, threads, concurrency control, synchronization, CPU scheduling and semaphores.
3. The general concepts and algorithms used in process management, deadlock handling, memory management, file systems, I/O systems and security.
4. Implementation specific issues based on the Linux and Windows Operating Systems.

MODULE I

Introduction to Operating Systems: Overview and working of different operating systems. (3Hrs)

Process management: Concept, Threads, CPU Scheduling, Process Synchronization.(4Hrs)

Deadlocks: Concept, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery. (5Hrs)

MODULE II

Memory management: Concept, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with paging. (5Hrs)

Virtual memory: Concept, Demand paging, Page replacement, Thrashing. (4Hrs)

File System: File system interface and File system implementation (3 Hrs)

MODULE III

I/O Systems: Overview of I/O Systems, Secondary storage structure, Tertiary storage structure. (08Hrs)

Protection and security issues. (03Hrs)

MODULE IV

Case studies of operating systems- Windows and Unix. (08Hrs)

Basic overview, commands, process management and memory management in each.

Shell programming in Unix. (03Hrs)

TEXT BOOKS:

1. The Operating System Concepts by Silberschatz and Galvin, Wesley Publishing Co. (page numbers given in syllabus as per the 3rd edition)
2. Operating Systems by W Stallings. PHI. (page numbers given in syllabus as per the 5th edition)
3. UNIX – Concepts and applications by Sumitabha Das, Tata McGraw Hill (page numbersgiven in syllabus as per the 3rd edition)

REFERENCE BOOKS

1. Operating systems, Design and implementation by A.S Tanenbaum,PHI.
2. Operating Systems by Milenkovic, Tata McGraw Hill.
3. Operating Systems by Achyut S. Godbole, Tata McGraw Hill.
4. The Design of the UNIX Operating System by Maurice J. Bach, PHI
5. Linux Kernel Internals by M Beck, H Bohme, M Dziadzka, U Kunitz, R Magnus, DVerworner, Addison Wesley
6. Unix System Programming using C++ by Terence Chan, PHI

IT 5.6 DATABASE MANAGEMENT SYSTEMS

Lectures per week : (3+1+2)

Max. Marks for Theory paper : 100

Max. Marks for Sessionals	: 20 + 5
Max. Marks for Practical Exam	: 50
Duration of paper	: 3 hours
Total no. of modules	: 4
No. of questions from each module	: 2
Total no. of questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module).

Course Objective:

This course introduces database management system (DBMS) which is computer software designed for the purpose of managing databases. It is a collection of programs that enables you to store, modify, and extract information from a database. The students will learn Database concepts, Data Models, various approaches to Database Design, Relational Model, Optimization principles and Control.

Instructional Objective:

At the end of the course the student will be able to:

1. Understand the key concepts and terminology of RDBMS
2. Learn the basics of database modeling.
3. Understand database design and normalization techniques.
4. Implement access to the data using various techniques.
5. Know the strategies and methods for query processing, optimization, database transaction processing and security.

MODULEI

Database systems versus File system. Data base administrator & Data base Users. Characteristics of the Data base. Data base Systems Architecture. Data Models View of data. Schemes & Instances . Database system Architecture & Data Independence Data base Languages. (3 Hrs)

Entities, Attributes and Relationships. Cardinality of Relationships, Keys, Strong and Weak Entity Sets. E-R Diagram notation. Extended ER: Generalization, Specialization, and Aggregation. Translating your ER Model into Relational Model (3Hrs)

Relational Data Model & Relational Algebra. Relational Model Concepts. Relational Model Constraints and Relational Algebra. Operations like select, project, rename, Set operations, join, Division, Aggregate functions (3Hrs)

Tuple variables, Range Relations, Expressions, Formulae, Quantifiers, Safe Expressions. Domain Relational Calculus : Formal Definition, Safe expressions (3Hrs)

MODULE II

Structured Query Languages (SQL): Data Definition in SQL-Insert, Delete, Update, Create, Data Manipulation Query:Select with all options, Aggregate functions , Nested sub queries, View and Queries in SQL, Specifying Constraints and Indexes in SQLQBE (Query-By-Example) (4Hrs)

Schema refinement: Problems Caused by redundancy, Functional dependencies-Closure of set of FD's, Closure of attribute set, Canonical cover keys, Decompositions Problem related to decomposition, reasoning about FDS, Normalization, FIRST, SECOND, THIRD Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies, fourth Normal Form, Domain key Normal form DKNF, Project join Normal form PJNF. (8Hrs)

MODULE 3

Query Processing: Measures of query cost selection, Translating SQL queries into Relational algebra: Sorting, Join, Nested Loop join, Block Nested Loop join, Merge join, Hybrid-Hash join and Pipelining. Using Heuristics in Query Optimization: Query tree, Query graph, Converting query trees into Query evaluation plan using selectivity and cost estimates in optimization. (9 Hrs)

Query Optimization using database language (2 Hrs)

MODULE 4

Database Security and Authorization: Types of security, database security and DBA, Granting/Revoking of privileges (using views) examples, Multilevel security (3 Hrs)

Transaction Processing Concepts: Introduction to Transaction processing, Transaction and system Concepts, Desirable properties of Transactions, Commit and rollback of transactions. (3 Hrs)

Database Recovery techniques: Concepts, Recovery techniques based on deferred update: Single user, Multi User. Immediate update-Undo/redo, ARIES recovery algorithm Recovery in multidatabase systems. (3 Hrs)

Concurrency Control techniques: Locking Techniques for concurrency Control, Concurrency Control based on timestamps ordering, Multiversion Concurrency Control Techniques (3Hrs)

TEXT BOOKS:

1. Database System Concepts by Abraham Silberschatz, Henry F. Korth- 4th Ed., TMH
2. Fundamentals of Database Systems by Elmasri & Navathe, Addison Wesley 3rd Ed.,

REFERENCE BOOKS:

1. An Introduction to Data Base Systems by C. J. Date Pearson Education, Addison Wesley
2. An Introduction to Database Concepts by Desai B, Galgotia
3. Principles of Data base systems by J. D. Ullman, "2nd Ed., Galgotia Publications, 1999

IT 6.1ED ENTREPRENEURSHIP DEVELOPMENT

Lecture Per week	: (3+ 0+ 0)
Max Marks for Theory paper	: 100
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course Objective:

To expose the students to the comprehensive Entrepreneurship Development and equip them with requisite skills, knowledge and competencies so that they can take up Entrepreneurship as their career

Instructional Objective:

At the end of the course, the students would be familiar with the following:

•Concept of Entrepreneurship.

•Project identification, development and implementation

•Project financing, institutional finance and SSI

•Project Management.

MODULE I

Definition and clarification of concept of entrepreneurship: Qualities of an entrepreneur Skills required for entrepreneurship, Functions of an entrepreneur, Importance of entrepreneur in economic development. (2 Hrs)

Theories of Entrepreneurship: Economic theory, Sociological theory, Psychological theory.

(1 Hr)

Types of entrepreneurs: Based on type of business, Based on use of technology, Based on motivation, Based on stages of development, Based on motive, Based on capital ownership, Danhof's classification. Other types

(1 Hr)

Project identification: External environment analysis, Meaning and characteristics of a project, Classification of projects, Project life-cycle, Project identification, Sources and screening of project ideas. (2 Hrs)

Project formulation: Meaning and significance, Feasibility analysis, Techno-economic analysis, Input analysis, Financial analysis, Social cost benefit analysis. Project feasibility

(1 Hr)

Pre-feasibility study: Project feasibility report - Meaning, Importance and Contents Importance of location of a project. (2 Hrs)

MODULE II

Project financing and institutional finance: Classification of capital – Fixed capital - Meaning, Factors governing fixed capital requirements, Working capital – Meaning and concepts, Types, Factors determining working capital requirements. (2 Hrs)

Sources of finance – Share capital, Debenture capital, Lease finance and term loans from commercial banks. (1 Hr)

Institutional finance. IFCI, ICICI, IDBI, SIDBI, EXIM Bank, Commercial banks – Functions and schemes (2 Hrs)

Small scale industries: Definition and characteristics, Role in Indian economy, Steps for starting a SSI unit, Problems faced by SSIs. Incentives and subsidies – Need and Types.

(3 Hrs)

MODULE III

Financial aspects: Break even analysis, Income statement, Balance sheet. (5 Hrs)

Profit and loss account, Fund flow statement, Ratio analysis – Liquidity, leverage and profitability ratios. (4 hrs)

Capital budgeting – Need, Importance, Process, Nature of capital budgeting problem, Weighted average cost of capital, approaches to fixing a capital budget, methods of project evaluation (Payback period, Accounting rate of return, discounted cash flow, Net Present Value Index) (4 Hrs)

MODULE IV

Managerial aspects: Introduction to management, Functions of a manager, Different schools of management. (5 Hrs)

Types of organisation structures, Leadership- Trait theory, Behavioural theory, Contingency theory, Motivation -Carrot and stick theory, Maslow's theory, Herzberg's theory, Vroom's theory, McClelland's theory. (3 Hrs)

Communication – Importance, Process, types and forms, Barriers to communication, Principles of effective communication. (2Hrs)

Marketing management, Meaning and importance, Marketing mix, Types of marketing tasks, Market segmentation – process and criteria, Marketing implementation and control. (3 Hrs)

TEXT BOOKS:

1. Entrepreneurial Development and Project Management by A. Vinod 4th Edition Calicut University Publication, 2002
2. Entrepreneurship and Small Business Management by Dr C.B. Gupta and Dr. S.S. Khanka 2nd Edition, Sultan Chand and Sons, 1997
3. Entrepreneurship Development by Dr. C.B.Gupta and N.P.Srinivasan 4th Edition, Sultan Chand and Sons, 1997

REFERENCE BOOKS

1. Marketing Management by Philip Kotler 11th edition, Pearson Education, 2003
2. Principles of Management by P. C. Tripathi and P.N. Reddy 2nd Edition Tata McGraw Hill, 1991
3. Fundamentals of Financial Management by Prassanna Chandra 3rd Edition Tata McGraw Hill, 2001
4. Management by Harold Koontz and Heinz Weihrich 9th Edition McGraw Hill, 1988

IT 6.2TC THEORY OF COMPUTATION

Lecture Per week : (3+ 0+ 2)

Max Marks for Theory paper : 100

Max marks for sessionals : 20 + 5

Duration of Paper : 3 hours

Total Number of Modules : 4

Number of Questions from Each Module : 2 (Each question shall carry 20marks)

Total Number of Questions to be answered: 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives

The major objective of this course is to introduce the student to the concepts of theory of computation in computer science. The student should acquire insights into the relationship amongst formal languages, formal grammars, and automata.

Instructional Objective:

At the end of the course, the students would be familiar with the following:

• formal languages and grammars

• finite-state automata, pushdown automata

• Turing machines, Church's Thesis, undecidability

• Recursively Enumerable Languages and Unsolvable Problems.

MODULE I

Regular Languages and Finite Automata :- Regular Languages and Regular Expressions, The memory required to recognize a language, Finite Automata (DFA), Distinguishing one string from another, Union, Intersection, and Complements. (6 Hrs)

Nondeterministic and Kleene's theorem :- NFA, Converting NFA to DFA,€-NFA ,Kleene's theorem, Converting an €-NFA to an NFA, Regular Languages, MyHill-Nerode theorem Minimal

finite Automata, The pumping lemma for regular languages, Closure properties Decision Problem, Moore and Mealy Machine. (6 Hrs)

MODULE II

Context –free Grammars and Push down Automata:- Context –Free Grammars and Languages Derivation Trees and Ambiguity, An unambiguous CFG for algebraic Expression, Simplified forms and Normal Forms – CNF, GNF. (6 Hrs)

Pumping Lemma,Closure Properties, Push Down Automata :- DPDA, PDA corresponding to a given CFG – Top-down PDA, Bottom-up PDA, CFG corresponding to a given PDA, Parsing Top-down parsing, Bottom-up parsing. (6 Hrs)

MODULE III

Turing Machine and their languages :- Turing Machine Introduction, Computing a Partial function with a Turing machine, Combining Turing machine. (8 Hrs)

Variations of Turing Machine, Nondeterministic Turing Machine, Universal Turing Machine, Church-Turing Thesis. (4 Hrs)

MODULE IV

Recursively Enumerable and Recursive languages, Enumerating a Language, General Grammars Unrestricted Grammars and Turing Machine. Context-Sensitive Language and Grammar Linear Bounded Automata, Chomsky Hierarchy. (8 Hrs)

Unsolvable Problems :- A non recursive language and unsolvable Decision problems, Reducing one problem to another, The halting problem. Rice's Theorem. Closure Properties of families of languages. (8 Hrs)

TEXT BOOKS:

1. Introduction to languages and the theory of computation By John C. Martin, Tata McGraw Hill
2. Introduction to Automata Theory, Languages and Computation By Hopcraft and Ullman, Narosa Publishing House

REFERENCE BOOKS:

1. Theoretical Science - By Krishnamurthy, AWEP.
2. Theory of Computer Science - By Brady, McGraw Hill.
3. Computations, Finite and Infinite Machines - By Minsky, Prentice Hall

IT 6.3CN COMPUTER NETWORKS

Lecture Per week : (3+ 1+ 2)

Max Marks for Theory paper : 100

Max marks for sessionals : 20 + 5

Duration of Paper : 3 hours

Total Number of Modules : 4

Number of Questions from Each Module : 2 (Each question shall carry 20marks)

Total Number of Questions to be answered: 5(At least one question from each module with two compulsory questions from any one module)

Course Objective:

This course will focus on imparting knowledge about various components of data communications emphasizing on the physical layer and data link layer of the OSI stack. It also provides overview of computer networks .

Instructional Objectives:

At the end of the course, the student will:

•Understand the basic concepts of data communication components used at various transmission speeds.

•Identify the characteristics and analyze specific role of Data Communication technologies such as multiplexers, ISDN, ATM, wireless, satellite and fiber optic communication.

• Get an overview of 3G networks, LAN and WAN

MODULE I

Data Link Layer - Medium Access Sub layer (MAC). Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access (CSMA) protocols, Collision-free protocols – Bit-Map Protocol, Binary Countdown, Limited contention protocols – Adaptive Tree Walk Protocol , WDMA (Wavelength Division Multiple Access) Protocol.

Network Layer: The OSI Model and functions of the seven layers, TCP/IP Protocol stack – Concept of IP Address ARP, RARP, ICMP, Ports and Sockets, TCP and UDP Connections.

MODULE II

Network Layer (Contd.): Network Layer design issues , Routing Algorithms, CongestionControl algorithms. Networking and Internetworking Devices: Repeaters, bridges, routers and gateways. Application Layer of TCP/IP: Domain Name System – DNS, File Transfer Protocol – FTP Telnet Protocol, Hyper Text Transfer Protocol (HTTP) , Simple Mail Transfer Protocol (SMTP) Simple Network Management Protocol (SNMP)

MODULE III

Integrated Services Digital Network (ISDN): Principles & Objectives of ISDN, User Interface of ISDN, Architecture of ISDN, ISDN Physical Layer, ISDN Data Link Layer.

MODULE IV

Frame Relay: Frame Relay - Protocols and Services, Frame Relay Congestion Control . Asynchronous Transfer Mode – ATM: Asynchronous ATM – ATM Protocols, ATM Adaptation

Layer, ATM Traffic and Congestion Control . Wireless Communication – An Overview: History of wireless communication, and future trends Wireless Generations and Standards, Cellular Concept and Cellular System Fundamentals , Wireless Standards. Antennas : WLAN Technology and Bluetooth, Introduction to Wireless WANs , GSM Networks, Satellite Communications.

TEXT BOOKS:

1. Data and Computer Communication - William Stallings
2. ISDN and Broadband ISDN with Frame Relay & ATM – William Stallings, 4th Edition

REFERENCE BOOKS:

1. Computer Networks – Andrew Tanenbaum
2. Wireless Networked Communications: Concepts, Technology and Implementation-Bud Bates
3. Computer Networks and Internets - Douglas Comer
4. Design and Analysis of Computer Communication Networks – V. Ahuja ,McGraw Hill

IT 6.4CG COMPUTER GRAPHICS

Lecture Per week	: (3+ 1+ 2)
Max Marks for Theory paper	: 100
Max Marks for Practical	: 50
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2 (Each question shall carry 20marks)
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

*Disclaimer: Page numbers listed for each topic are only suggestions. Teacher may include

Course Objectives:

•This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.

•A thorough introduction to computer graphics techniques, including 3D modeling, rendering and animation. Topics cover: geometric transformations, geometric algorithms, 3D object models (surface and volume), visible surface detection algorithms, image synthesis, shading and mapping, global illumination and animation techniques

Instructional Objectives

•Describe the purpose of Computer Graphics and its applications

•Describe and implement methods for performing 2-Dimensional geometric transformations.

•Describe the concept of 3-Dimensional Graphics and methods for performing 3- Dimensional geometric transformations.

MODULE I

Overview of graphic systems**:** Video display devices, Refresh cathode ray tubes Raster scan displays, Random scan displays, Color CRT monitors, Direct view storage tubes Flat panel Displays, Raster scans systems, Random scan systems. Input devices: Keyboard, Mouse, Trackball and Space ball, Joystick, Image scanners, Touch panels, Light pens (5 hrs)

Output Primitives. Points and lines, Line drawing algorithms, DDA, Bresenhams line algorithm Circle generating algorithms, Properties of circles, Midpoint circle algorithm, Ellipse generating algorithm, Properties of Ellipses, Midpoint ellipse algorithm, Filled area primitives, Scan line polygon Fill algorithm, Inside – outside tests, Scan line fill of curved boundary, Boundary fill algorithm, Flood fill algorithm, Fill area functions. (5 hrs)

Attributes of Output Primitives: Line Attributes, Pen and brush options, Curve attributes, Color and gray scale levels, Color tables, Area fill attributes, Character attributes, Text attributes, Marker attributes, Antialiasing . (3 Hrs)

MODULE II

Two Dimensional Geometric Transformations: Basic Transformations, Translation, Rotation, Scaling, Composite transformation, Translations, Rotations, Scaling, Other transformations, Reflection, Shear. (2 Hrs)

Two-Dimensional Viewing:The viewing pipeline, Viewing coordinate reference frame, Window to viewport coordinate transformation, 2-D viewing functions, Clipping operations, Point

Clipping, Line clipping , Cohen- Sutherland Line Clipping, Polygon Clipping, Sutherland Hodgeman Polygon clipping, Weiler- Atherton Polygon Clipping, Other polygon clipping algorithm. Curve clipping, Text clipping. (4 Hrs)

Graphical User Interface and Interactive Input Methods: Input to Graphical Data, Logical classification of Input devices, Locator devices, Stroke devices, String devices, Valuator devices Choice devices, Pick devices. (2 Hrs)

Graphical Input Techniques: Positioning Techniques, Pointing and Selection, Inking and Painting Event Handling: Polling, Interrupts, The Event Queue, Light-Pen Interrupts. Input functions. Raster Graphics Fundamentals. Window and View port. (4 hrs)

MODULE III

Three Dimensional Concepts: 3- Dimensional display methods, Parallel projections Perspective projection, Depth cueing, Surface rendering, Exploded and cutaway views. Three Dimensional Object representations, Polygon surfaces, Polygon tables, Three Dimensional Geometric and Modeling transformations. (4 Hrs)

Three Dimensional Viewing, Transformation from world to viewing coordinates Projections. Design of a Simple Graphics Package. Functional Domains, Graphic Primitives Windowing Functions, Miscellaneous Functions. (4 Hrs)

Picture Structure: Defining Symbols By Procedures, Display Procedures, Boxing, Structured Display Files. Techniques for Achieving Realism. Curves And Surfaces: Shape Description Requirements, Parametric Functions, Bezier Methods. B-Spline Methods. (4 Hrs)

MODULE IV

Classification of visible – surface detection algorithms. Illumination Models and Surface-Rendering Methods. Color Models and Color Applications. Computer Animation**:** Design of animation sequences, General computer animation functions, Raster Animations, Computer animation languages, Motion specification, Direct motion specification, Goal directed systems Kinematics and dynamics. (7 Hrs)

Display Processors. Device-Independent Graphics Systems,Device Independence, Graphics System Design. User Interface Design, Components of the User Interface. The Users Model.

(5Hrs)

TEXT BOOKS

1. Computer Graphics By Donald Hearn and M. P. Baker, Prentice Hall of India Pvt. Ltd. ISBN-81-203-0944-8.
2. Principles of Interactive Graphics By William Newman and Robert Sproull, Tata McGraw hill Publishing company Ltd. ISBN-0-07-463293-0

REFERENCE BOOKS:

1. Introduction to Computer Graphics By N. Krishnamurthy, TMH
2. Computer Graphics By Steven Harrington, Tata McGraw Hill.
3. Computer Graphics: Principles and Practice By Foley, Van Dam, Feiner and Hughes

IT 6.5WT WEB TECHNOLOGY

Lecture Per week	: (3+ 1+ 2)
Max Marks for Theory paper	: 100
Max Marks for Practical	: 50
Max marks for sessionals	: 20 + 5
Duration of Paper	: 3 hours
Total Number of Modules	: 4
Number of Questions from Each Module	: 2
Total Number of Questions to be answered	: 5(At least one question from each module with two compulsory questions from any one module)

Course objectives:

This course introduces the technologies behind today's web-based applications. Students will be motivated to working with and building real web applications. After completing this course, students will acquire a good understanding of the basic design principles of the web model of computing.

Instructional objectives:

At the end of course student will be able to apply the technology to build and maintain web pages in static or dynamic manner.

MODULE I

Domain name servers, HTTP, Web browsers, Web Servers, Proxy Servers, Web searching and Web casting techniques. (4Hrs)

Creating a website and mark-up languages: HTML, XML, JavaScript, CSS, Ajax (7Hrs)

MODULE II

Java Technology: Java Evolution, Overview of Java and JVM, Data types and scope of variables Classes, objects and methods, Arrays, strings and vectors, Interfaces, Packages, Exceptional Handling, Thread Programming, File Handling in Java. (8 Hrs)

GUI/Swing Programming, JDBC. Applet Programming (4Hrs)

MODULE III

Understanding the .Net Framework: .Net Frame work, benefits, Elements of the framework, Common Language Runtime:.Net Class Library, Unifying Components,.Net with ASP.Net,

(6Hrs)

Creating and deploying an ASP.net application. Building Forms with Web Controls. Validating User Input .ASP.net Security:IIS Server, Authentication , Role-based Security.

(6Hrs)

MODULE IV

User Sessions in e-commerce applications. Techniques for maintaining state information. Types of Web Pages: Static, Dynamic, Active (2 Hrs)

Java Servlets, JSP –life cycle, implementation (6 Hrs)

E-Commerce security issues: Cryptography, Digital Signatures, Digital Certificates

Case Study on Ruby on Rails- Ruby, Rails, Advantages of Ruby on Rails. (3Hrs)

TEXT BOOKS:

1. Web Technologies by Achyut Godbole, Wesley Publishing Co.2008
2. Programming with Java by E. Balaguruswamy. TMG. (3rd Edition)
3. ASP.net Bible by Mridula Parihar et. all. Tata MCgraw Hill (2005)
4. Internet and World wide Web. How to program byP.J Deitel .H.M Deitel (4th Edition)

REFERENCE BOOKS:

1. Java 2 Complete Reference – Herbert Schildt -3rd edition.
2. Internet and web technologies by Raj kamal (2002

http:// www.ajax.org

http:// www.rubyonrails.org

IT 6.6STQA SOFTWARE TESTING AND QUALITY ASSURANCE

Lecture Per week : (3+ 1+ 2)

Max Marks for Theory paper : 100

Max marks for sessionals : 20 + 5

Duration of Paper : 3 hours

Total Number of Modules : 4

Number of Questions from Each Module : 2

Total Number of Questions to be answered : 5(At least one question from each module with two compulsory questions from any one module)

Course Objectives:

To enable students to develop and implement an effective testing strategy, plan and prepare appropriate tests for all phases of development and be able to measure and control the quality of their testing. To convince students of the importance of finding and resolving error early and to give them strategies and techniques for building-in quality from the start.

Instructional objectives:

This course will enable students to:

- Manage, plan and prepare rigorous, formal, visible and repeatable tests that will fully exercise software, in the development of quality systems.
- Apply different testing approaches to all stages of software development.
- Prepare test plans, strategy, specifications, procedures and controls to provide a structured approach to testing.
- Apply the techniques and methods covered to testing packages.
- Describe the different types of testing tools available and identify the appropriate types of tools for their needs.

MODULE I

Introduction: Quality perspective and expectations, Quality framework and ISO 9126, Correctness and defects. Quality Assurance: Classification, Defect prevention, Defect reduction, Defect containment. Quality Assurance in context: Handling discovered defects during QA activities, QA activities, Verification and validation perspective (7 Hrs)

Quality Engineering: Activities & Process, Quality planning, Quality assessment & improving, ISO 9000 series standards. Capability Maturity Model integration for software engineering. (5 Hrs)

MODULE II

Testing concepts, issues and testing: Purpose, activities, process and context, issues and questions about testing, Functional v/s structural testing, Coverage based v/s usage based testing. Test activities management and automation: Test planning and preparation, Test execution, result checking and measurement, Analysis and follow up, Activities, people and management. Coverage and usage testing based on checklists and partitions: Checklist based testing and limitations,

Testing for partition coverage, Usage based statistical testing with Musa's operational profiles. (8 Hrs)

Input domain partitioning and boundary testing: Input domain partitioning and testing, Simple domain analysis and extreme point combination strategies, Testing strategies based on boundary analysis. (4 Hrs)

MODULE III

Defect prevention and process improvement: Basic concepts and generic approaches, Root cause analysis for defect prevention, Training for defect prevention, Defect prevention techniques. (4 Hrs)

Software inspection: Concepts and generic process, Inspection and related activities, Defect detection techniques, tool/process support effectiveness. (2 Hrs)

Coverage and usage testing based on finite state machines: Finite State Machines (FSM)and testing, FSM testing, FSM based testing of web based applications, Markov Chains and Unified Markov Models (UMM) for testing, Using UMM's for usage based statistical testing, Testing based on Web usages. (5 Hrs)

MODULE IV

Software testing tools and overview: Need for automated testing tools, Taxonomy of testing tools, Functional/Regression testing tools, Performance testing tools, Testing management tools, Source code testing tools, Selection of testing tools. (6 Hrs)

Case study: Overview of WinRunner, LoadRunner, Quick Test Professional and SQA Robot.

(5 Hrs)

TEXT BOOKS:

1. Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement by Jeff Tian, Edition 2006, ISBN: 81-265-0805-1
2. Software Testing Tools by Dr. K.V.K.K. Prasad.

REFERENCE BOOKS:

1. Effective methods for Software testing by William E. Perry, 3rd edition.
2. Introducing Software testing by Louise Tamares, ISBN: 81-7808-678-6

SEMESTER VI

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 6.1	Entrepreneurship Development	3	0	0	3	100	20 + 5	-	-	125
IT 6.2	Theory of Computation	3	0	2	3	100	20 + 5	-	-	125
IT 6.3	Computer Networks	3	1	2	3	100	20 + 5	-	-	125
IT 6.4	Computer Graphics	3	1	2	3	100	20 + 5	50	-	175
IT 6.5	Web Technology	3	1	2	3	100	20 + 5	50	-	175
IT 6.6	Software Testing & Quality Assurance	3	1	2	3	100	20 + 5	-	-	125
	TOTAL	18	04	10	-	600	150	100	-	850

L- Lectures, T- Tutorials, P- Practicals,
Th-.Dur.- Duration of Theory paper, Th-Theory, S-Sessional, O-Oral.
25 Sessional marks will be split as follows: 20 marks are for the Internal Test,
5 marks are for continuous evaluation of Practicals/Assignments