GOVT. COLLEGE OF ENGINEERING, AMRAVATI

B. TECH. (Information Technology)
VII and VIII Semester
CURRICULUM
Department of Information Technology
2013-14

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVTI.

Department of Information Technology.

Proposed Scheme for B. Tech. (Information Technology)

SEM III

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	Credits
SHU304	Engineering Mathematics-III	3	--	---	3	10	15	15	60	---	---	100	3
ETU311	Electronic Devices and Circuits	3	---	---	3	10	15	15	60	---	---	100	3
CSU301	Programming Methodology	3	1	---	4	10	15	15	60	---	---	100	4
ITU301	Communication Engineering	3	1	---	4	10	15	15	60	---	---	100	4
CSU303	Discrete Mathematics and Graph Theory	3	---	---	3	10	15	15	60	---	---	100	3
SHU305	General Proficiency II	1	---	2	3	---	---	---	---	25	25	50	2
ETU312	Electronic Devices and Circuits Lab	---	---	2	2	---	---	---	---	50	---	50	1
CSU304	Programming Methodology Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU302	Communication Engineering Lab	---	---	2	2	---	---	---	---	25	25	50	1
CSU306	System administration-I Lab	---	---	2	2	---	---	---	---	25	25	50	1
Total		**16**	**2**	**10**	**28**	**---**	**75**	**75**	**300**	**150**	**100**	**750**	**23**

SEM IV

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	Credits
CSU401	Numerical Method and Computer Programming	3	--	---	3	10	15	15	60	---	---	100	3
CSU402	Data Structure	3	1	---	4	10	15	15	60	---	---	100	4
CSU403	Object Oriented Technology	3	1	---	4	10	15	15	60	---	---	100	4
ITU401	Digital Integrated Circuits	3	---	---	3	10	15	15	60	---	---	100	3
ITU 402	Data Communication	3	---	---	3	10	15	15	60	---	---	100	3
CSU404	Data Structure Lab	1	---	2	3					50	-	50	2
ITU403	Data Communication Lab	---	---	2	2	---	---	---	---	25	25	50	1
CSU405	Object Oriented Technology Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU404	Digital Integrated Circuits Lab	---	---	2	2	---	---	---	---	25	25	50	1
CSU406	System administration-II Lab	---	---	2	2	---	---	---	---	25	25	50	1
Total		**16**	2	**10**	**28**	**50**	**75**	**75**	**300**	**150**	**100**	**750**	**23**

TA :Teacher Assessment **CT: Class Tests** **ESE: End Semester Examination** **ICA : Internal Continuous Assessment**

Department of Information Technology

Proposed Scheme for B. Tech. (Information Technology)

SEM V

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	Credits
ITU501	System Analysis and Design	3		---	3	10	15	15	60	---	---	100	3
ITU502	Database Management System	3	---	---	3	10	15	15	60	---	---	100	3
CSU501	System Programming	3	---	---	3	10	15	15	60	---	---	100	3
CSU502	Theory of Computation	3	---	---	3	10	15	15	60	---	---	100	3
CSU503	Principles of Management	3	---	---	3	10	15	15	60	---	---	100	3
ITU503	System Analysis and Design Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU504	Database Management System Lab	---	---	2	2	---	---	---	---	25	---	25	1
CSU504	System Programming Lab	---	---	2	2	---	---	---	---	25	25	50	1
CSU505	Hardware Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU505	System Administration-III Lab	1	---	2	3	---	---	---	---	25	25	50	2
ITU506	Self Study I	---	---	----	---	25	---	---	---	---	---	25	2
Total		**16**		10	**26**	**75**	**75**	**75**	**300**	**125**	**100**	**750**	**23**

Note1: Self study I is based on one class test each on the basis of 20% curriculum of the courses ITU501,ITU502,CSU501,CSU502 declared by respective course coordinator at the beginning of semester. One faculty member shall be appointed as course coordinator for self study I and his/her teaching work load shall be considered as one hour per week.

SEM VI

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	Credits
ITU601	Design and Analysis of Algorithms	3	--	---	3	10	15	15	60	---	---	100	3
ITU602	Web Technology	3	---	---	3	10	15	15	60	---	---	100	3
CSU602	Operating System Design	3	---	---	3	10	15	15	60	---	---	100	3
CSU603	Computer Network	3	---	---	3	10	15	15	60	---	---	100	3
ITU603	E-Commerce	3	---	---	3	10	15	15	60	---	---	100	3
ITU604	Design & Analysis of Algorithms Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU605	Web Technology Lab	---	---	2	2	---	---	---	---	25	---	25	1
CSU606	Operating System Design Lab	---	---	2	2	---	---	---	---	25	25	50	1
CSU607	Computer Network Lab	---	---	2	2					25	25	50	1
ITU606	Minor Project	----	----	2	2	---	----	---	----	25	25	50	2
ITU607	Self Study II	---	---	----	---	25	---	---	---	---	---	25	2
ITU608	Industrial Lecture I*	1	---	----	1	---	---	---	---	---	---	---	---
Total		**16**		10	**26**	**75**	**75**	**75**	**300**	**125**	**100**	**750**	**23**

Note2: Self study II is based on one class test each on the basis of 20% curriculum of the courses ITU601,ITU602,CSU602,CSU603 declared by respective course coordinator at the beginning of semester. One faculty member shall be appointed as course coordinator for self study II and his/her teaching work load shall be considered as one hour per week.

TA :Teacher Assessment **CT: Class Tests** **ESE: End Semester Examination** **ICA : Internal Continuous Assessment**

Department of Information Technology.

Proposed Scheme for B. Tech. (Information Technology)

SEM VII

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							Credits
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	
ITU701	Compiler Construction	3	---		3	10	15	15	60	---	---	100	3
ITU702	Microprocessor and Interfacing	3	---		3	10	15	15	60	---	---	100	3
ITU703	Elective -I	3	---		3	10	15	15	60	---	---	100	3
ITU704	Interdisciplinary Elective	3	---		3	10	15	15	60	---	---	100	3
ITU705	Compiler Construction Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU706	Microprocessor and Interfacing Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU707	Elective-I Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU708	Project Phase -I	---	---	4	4	---	---	---	---	50	--	50	2
ITU709	Seminar	---	---	2	2	---	---	---	---	50	---	50	2
ITU710	Industrial Training/Visit	---	---	---	---	---	---	---	---	50	---	50	1
ITU711	Industrial Lecture- II*	1	---		1	---	---	---	---	25	---	25	1
ITU712	Self Study III	---	---	---	----	25	---	---	---	---	---	25	2
Total		13	---	12	25	65	60	60	240	250	75	750	23

***Note4:** Credit shall be awarded on the basis of combined assessment of Industrial Lecture I & Industrial Lecture II

Note5: Self study III is based on one class test each on the basis of 20% curriculum of the courses ITU701, ITU702, ITU703 declared by respective course coordinator at the beginning of semester. One faculty member shall be appointed as course coordinator for self study III and his/her teaching work load shall be considered as one hour per week.

SEM VIII

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							Credits
						Theory				Practical			
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE	Total	
ITU801	Data Warehousing and Data Mining	3			3	10	15	15	60			100	3
ITU802	Network Administration & Security	3	---	---	3	10	15	15	60	---	---	100	3
ITU803	Elective-II**	3	---	---	3	10	15	15	60	---	---	100	3
ITU804	Elective-III***	3	---	---	3	10	15	15	60	---	---	100	3
ITU805	Data Warehousing and Data Mining Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU806	Network Administration & Security Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU807	Elective-II ** Lab	---	---	2	2	---	---	---	---	25	25	50	1
ITU808	Project Phase-II	---	---	6	6	---	---	---	---	75	100	175	6
ITU809	Self Study IV	---	---	---	---	25	---	---	---	---	----	25	2
Total		12		12	24	65	60	60	240	150	175	750	23

Note6: Self study IV is based on one class test each on the basis of 20% curriculum of the courses ITU801,ITU802 ,ITU803,ITU804 declared by respective course coordinator at the beginning of semester. One faculty member shall be appointed as course coordinator for self study IV and his/her teaching work load shall be considered as one hour per week.

Note7: Students of this department shall select any one Interdisciplinary Elective offered by other department. Interdisciplinary Elective shown below will be offered to students of other department.

TA :Teacher Assessment CT: Class Tests ESE: End Semester Examination ICA : Internal Continuous Assessment

Elective I ITU703	**Interdisciplinary Elective ITU704**	**Elective II ITU803**	**Elective III ITU804**
A Distributed computing	A Computer Oriented Operation Research	A Artificial Neural Network	A Artificial Intelligence
B Optical Satellite and Communication	B Nanotechnology	B Advanced Web Technology	B Natural Language Processing
C Digital Signal Processing	C Software Engineering	C Software Planning and Management- Object Oriented Approach	C Functional and Logic Programming
D Embedded System	D Introduction to Systems Engineering	D Computer Graphics	D Parallel Computing
E BioInformatics		E Digital Image Processing	E High Performance Network
F Multimedia Technology			

ITU701 COMPILER CONSTRUCTION

Teaching Scheme: 03 L+ 00T Total-03 Credits: 03
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60ESE Total Marks: 100
Duration of ESE: 2hrs.30min.

Compiler structure : analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, error reporting, and implementation. Regular definition, Transition diagrams, LEX.

Syntax analysis: context free grammars, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing. Bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

Intermediate code generation: intermediate representations, translation of declarations, assignments. Intermediate Code generation for control flow, boolean expressions and procedure calls, implementation issues.

Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation. DAG representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

Code optimization, source of optimizations, optimization of basic blocks, loops, global dataflow analysis, solution to iterative dataflow equations. Code improving transformations, dealing with aliases, data flow analysis of structured flow graphs.

Text Books:-

1. Compilers: Principles, Techniques & Tools ,V. Aho, R. Sethi, & J. P. Ullman, Second Edition, Addision Wesley
2. Compiler Construction Principles and Practice ,Dhamdhere, D. M., Second Edition, Macmillan India, New Delhi,2002

Reference Books:-

1. Compiler Design , O.G. Kakde, Laxmi Publications Pvt Limited, 2008
2. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/compiler-desing/ui

ITU702 MICROPROCESSOR AND INTERFACING

Teaching Scheme: 03 L+ 00T Total 03 Credits: 03
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE Total Marks: 100
Duration of ESE: 2hrs.30min.

Introduction to 8086: Pin configuration, Physical memory organization, general bus organization, I/O addressing, 8086 minimum mode system & timings, Memory interfacing, static RAM Interfacing, dynamic RAM interfacing.
I/O interfacing: methods of I/O interfacing, 8255 PPI**:** Pin configuration, internal organization, modes of operation, interfacing with 8086**.**Programmable Interrupt Controller **Introduction to 8259**: Pin Configuration, various control & command words and internal organization, modes of operation, interfacing with 8086.

USART 8251: pin configuration, internal organization, control word formats for synchronous & Asynchronous modes of operation, 8251 interfacing with 8086.DMA controller 8237: pin Configuration, internal organization, modes of operation, 8237 interfacing with 8086.
Programmable Timer/counter 8254:pin configuration, Internal organization, all the modes of Operation, 8254 interfacing with 8086.Programmable Keyboard/display Controller 8279:pin Configuration, internal organization, modes of operation, interfacing with 8086.
ADC 0800/0809 :Its working, interfacing with 8086 and programming in polled mode, in interrupt-driven mode. DAC 0800/0808 its working, interfacing with 8086 and programming in polled mode, in interrupt-driven mode. Measurement of temperature, speed and frequency using ADCs/DACs
8086 maximum mode system & timings, bus controller 8288: Its architecture, operation and Interfacing with 8086. 8289 bus arbiter its architecture, operation and interfacing with 8086,Coprocessor configuration. ESC prefix, system bus mode, semaphores & LOCK prefix.

Text Books:
1.8086/8088 Families: Design, Programming& Interfacing, Uffenbeck John. P. 3rd Edition, Prentice-Hall Publication, 2001
2. Intel Processors: Programming, Interfacing & Applications, Walter A. Triebel, Avtar Singh ,3rd Edition, Prentice-Hall Publication ,2000.

Reference Books:
1.Intel Microprocessors, Bray B,4th Edition, PHI Publication, 1997.
2.Microprocessors Systems: The 8086/8088 Family, Liu & Gibson 2nd Edition,
3.Microprocessor Architecture, Programming, and Applications with the 8085,R.S.Gaonkar,5th Edition, Prentice Hall PTR,2002
4. Advanced Microprocessor & Interfacing, B. Ram,2nd Edition, Tata Mc-Graw Hill,2001

ITU703 ELECTIVE-I
(A) DISTRIBUTED COMPUTING

Teaching Scheme: 03 L+ 00T **Total 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Distributed Computing System: DCS models, Distributed systems architecture, Distributed Operating Systems: Definition, Design Issues, Introduction to Distributed Computing Environment, Key characteristics, resource sharing, openness concurrency, scalability, fault tolerance, transparency.

Distributed Systems Models: Client-Server model, Thin Client, Mobile Devices, Software agents. Fundamental models: Interaction, Failure and Security models.

Message passing : Desirable features of a Good Message Passing System, Issue in IPC by message passing Synchronization, Buffering, Multi datagram messages, encoding and decoding of message data, process addressing, failure handling, Group Communication, case study 4.3 BSD UNIX IPC mechanism.

Remote Procedure Call :RPC Model, Transparency of RPC, Implementing RPC mechanism, RPC messages, Marshaling arguments and results, Server management, Parameter passing semantics, Call semantics, Communication protocols for RPC, Client Server binding, Exception handling, Security, RPC in heterogeneous environments, Optimization for better performance.

Distributed Shared Memory: General architecture of DSM system, Design and Implementation, issues of DSM, Granularity, Structure of shared memory space, Consistency models, Replacement strategy, Thrashing, Other approaches to DSM, Advantages of distributed shared memory.

Synchronization: Clock Synchronization, Event Ordering, Mutual Exclusion, Deadlock, Election Algorithms. Resource Management: Features of Global Scheduling Algorithm, Task Assignment Approach, Load Sharing Approach.

Distributed File System : Desirable features of good Distributed file system, file models, File Accessing, Sharing, Caching methods, File replication, Fault tolerance, Atomic transactions, Design principles.

Case study: CORBA.

Text Book :

1. Distributed Operation System, Concepts and Design, P.K. Sinha, 2nd Edition, IEEE Press, Prentice Hall India,1998.
2. Distributed Systems Concepts and Design ,George Coulouris, Jean Dollimore, and Tim Kindberg, 3rd Edition., Addison Wesley, 2002

Reference Book:

1. Distributed Operating System ,A. S. Tanenbaum , 2nd Edition, Prentice Hall India ,2002.

ITU703 ELECTIVE-I
(B) OPTICAL AND SATELLITE COMMUNICATION

Teaching Scheme: 03 L + 00T **Total 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs. 30min.

Optical Fiber Communication System: Basic optical laws and definitions, Optical fiber Modes and configurations.

Numerical Aperture Attenuation: Units, absorption, scattering losses, radioactive losses, core and cladding losses, Material dispersion, wave guide dispersion, intermodal dispersion.

Optical Sources: Light Emitting Diodes: structure, light source materials.

Laser Diodes: Structure, threshold conditions, modulations of Laser diodes. Light source linearity, Reliability considerations.

Elements of Satellite Communication : Satellite frequency bands, communication satellite systems, Kepler's laws, Satellite orbits, LEO, MEO, GEO, HEO, LOOK angles & visibility, Orbital effect in communication system performance.

Satellite Link Design: Basic transmission theory, EIRP, Antennas Gain patterns, Common antenna type, parabolic disc, atmospheric losses, system noise temperature & G/T ratio, up link & Down link analysis.

Satellite Transponder: Transponder model, Satellite front end, R F filtering of digital carriers, introduction to satellite signal processing.

Text Books:

1. Optical Fiber Communication ,G.Keiser, 4th Edition, Tata McGraw Hill International Edition, 2000.
2. Satellite Communication, Gagliardi Robert M,1st Edition, CBS Publications & Distributor's, New Delhi,2004.

Reference Books:

1. Optical Fiber Communication and Applications, Seniors J.M., 2nd Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 1993.

ITU703 ELECTIVE-I
(C) DIGITAL SIGNAL PROCESSING

Teaching Scheme: 03 L+ 00T **Total 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Discrete Time Signals: Introduction to DSP, Advantages, basic elements of DSP system, Elementary discrete-time sequences.

Discrete Time Systems: Description, representation, classification (linear versus non linear, time-invariant versus time variant, static versus dynamic, casual versus non causal , stable versus unstable)

LTI systems: The convolution sum, properties of convolution, Analysis of causal LTI systems, stability of LTI systems, step response of LTI systems, difference equation, solution of difference equations, Impulse response of LTI recursive system, Correlation of discrete time signals and types.

Fourier Transforms: Definition & properties of Fourier transform, Finite duration sequences and the discrete Fourier transform (DFT), properties, circular convolution, Fast algorithms for the computation of DFT: radix-2 algorithms, Bit Reversal Algorithm.

Z- Transform: Definition of z- Transform, properties, rational z-Transforms, evaluation of the inverse z- Transforms analysis of linear time invariant systems in z-domain, transient and steady-state responses, causality, stability, pole-zero cancellation, relation with Fourier transform.

Digital Filters: Classification (LP, HP, BP, FIR and IIR filters), filter specifications, Impulse invariant transformation and bilinear transformation, Commonly used Analog filters and IIR Filter design example**,** Structures for realization of Discrete-Time systems.

Realization of FIR and IIR Systems: Direct Form, Cascade Form, Signal flow graph and Transposed structures, Cascade form, Lattice and Lattice-ladder.

Text Book:

1. Digital Signal Processing: Principles Algorithms and Applications ,J G Prokis and D G Manolokis, 4th Edition, Pearson Education Pvt .Ltd, 2006.
2. Discrete Time Signal Processing, A V Oppenheim, R W Schafer with J RBuck, 2nd Edition (PHI), 2005.

Reference Books:

1. Digital Signal Processing: A Computer-Based Approach, S K Mitra, 3rd Edition Tata McGraw Hill Publish Co. Ltd., 2001.
2. Digital Signal Processing a Practical Approach, E C Ifeacthor and B W Jervis ,1st Edition, Pearson Education, 2002.

ITU703 ELECTIVE-I
(D) EMBEDDED SYSTEM

Teaching Scheme: 03 L + 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Introduction to embedded systems, Processor in the system, Hardware units required in the exemplary cases, Software embedded into a system, Final Machine implementable software for a product, Software in Processor specific assembly language and high level language, Device drivers, device management using an operating systems, Software design for scheduling multiple tasks and devices using RTOS, Embedded SoC in VLSI circuits.

Structural units of the processor, Allocation of memory to program segment and blocks, memory map of the system, Memory blocks for different data sets and structures, Virtual Devices, Device drivers for parallel port, serial and timing devices, Context and periods for context switching, deadline and interrupt latency.

Embedded programming in assembly language and High level language: Function pointers, Function queues and ISR queues, Queues for implementing protocol for a network, Queuing of functions on interrupts, Use of FIFO queues, Stacks, Lists and Ordered Lists.

Modeling process: Use of dataflow & control data flow graphs, Programming model for event controlled or response time constraint, Real time programs, Inter process Communication and Synchronization, Multiple processes in an application, Sharing data by multiple tasks, use of finite states machine model & Petri net Model, Use of Semaphores for a task or for Critical section of code, Mutex & P & V, Priority inversion problems & deadlock situations IPC issues, Use of Semaphore flags or Mutex as resource key, use of message queues, mailboxes, pipes, virtual sockets, RPCs.

Introduction to RTOS: RTOS Services, Schedule management for multiple tasks in Real Time, Handling of interrupt source call, RTOS task scheduling models, Cooperative Round Robin Scheduling using a Circular Queue of ready tasks and using ordered list as per precedence constraints, cycling scheduling in Time Sharing, fixed Real Time scheduling, Precedence assignment in Scheduling algorithms, fifteen-point strategy for Synchronization, Embedded Linux Kernel, study of micro C/OS-II, Vx works.

Text Book:

1. Embedded Systems, Architecture, Programming & Design, Rajkamal, 2nd edition, Tata McGraw Hill, 2007.
2. Embedded System Design: A Unified Hardware/Software Introduction by Frank Vahid, Tony Givargis, 1st Edition, John Wiley & Sons publication, 2002.

Reference Books:

1. Real Time Systems, Jane W. S. Liu, 1st Edition, Pearson Education, 2004.

ITU703 ELECTIVE-I
(E) BIOINFORMATICS

Teaching Scheme: 03 L+ 00T **Total:03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Basics, Basics of biology

Sequences : Problem statement, Edit distance and substitution matrices, HMMs and pair wise HMMs, Global and local alignments, Spliced alignment, Space-efficient sequence alignment, Multiple alignment, Database searching tools, Sequence by hybridization, Profile HMMs

Structures : Protein structure alignment, Protein structure prediction

Phylogenetic trees : Large parsimony and small parsimony problems, Probabilistic approaches, Grammar-based approaches

Miscellaneous topics : Pathways and networks, Microarrays, Biomedical images

Text Books

1. An Introduction to Bioinformatics Algorithms,Jones, Pevzner. MIT Press
2. Biological Sequence Analysis , Durbin, Eddy, Krogh, Mitchison Cambridge University Press

Reference Books

1. Bioinformatics, A Practical Guide to the Analysis of Genes and Proteins , A.D. Baxevanis and B.F. Ouellettee
2. Bioinformatics: Sequence and Genome Analysis , David W. Mount
3. Essentials of Medical Genomics , Stuart M. Brown
4. Bioinformatics for Dummies , Jean-Michel Claverie & Cedric Notredame
5. Algorithms on Strings, Trees and Sequences, Gusfield. Cambridge University Press

ITU703 ELECTIVE-I
(F) MULTIMEDIA TECHNOLOGY

Teaching Scheme: 03 L+ 00T **Total:03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Introduction : Multimedia basic concepts, Multimedia building blocks, multimedia applications design considerations, goals and objectives, architectural support for multimedia processing. Multimedia Authoring Fundamentals: authoring fundamentals, card/page based, time based, icon based, theatrical-frame based and object based authoring, interactive multimedia software authoring basics.

Multimedia audio : Basic sound concepts, audio capture, sound processor, VOC, WAV file format for sound, MIDI standard, Basic audio compression technique: ADPCM in speech coding, MPEG audio compression Technique MP3 encoder and decoder.

Image and Video technology: Representation of image in digital format, BMP, TIFF file formats, Video technology, Video capture, Video processing, AVI file formats, NTSC, PAL, SECAM, television standards, HDTV, Video streaming.

Image compression techniques: Huffman coding, LZW, DCT, Run Length Coding,JPEG, JPEG 2000, Basic Video Compression Technique.

Video Compensation based on motion compensation: H.261, H.263, MPEG videocoding, MPEG1, MPEG4 and MPEG7.

Multimedia operating system and networking: OS support for continuous media applications, file systems and process management, multi media database management system, characteristics of multimedia database management system, system support, Distributed multimedia database management, Multimedia networking and multimedia communication systems, networking requirements, key technologies used for multimedia communication, traffic attributes, QoS.

Windows support to multimedia: Function Calls API, Support for WINDOWS.

Case study of audio driver

Text books:

1. Multimedia: Computing, Communication and Applications, Ralf Steinmetz, Klara Narrated, 2nd Edition, Prentice Hall, 1995.
2. Fundamentals of Multimedia, Ze nian Li, Marks S. Drew, 1st Edition, Pearson Education, 2004.

Reference Books:

1. Virtual Reality and Multimedia, Durano R. Begault, 1st Additional Professionals, 2002.

ITU704 INTERDISCIPLINARY ELECTIVE
(A) COMPUTER ORIENTED OPERATION RESEARCH

Teaching Scheme : 03 L+ 00T Total: 03 Credits : 03
Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE Total Marks :100
Duration of ESE: 2hrs.30min.

Introduction of Operations Research: Introduction, Characteristic, Phases, Scope of OR, Drawbacks and difficulties of OR, OR models, Solving OR models, Queuing and simulation model, Art of modeling

Simplex Method for Solution of LPP: Standard form of an LP problem, Simplex Algorithm for Maximization case, Simplex Algorithm for Minimization case; Big- M Method, Alternative optimal solution, unbounded solution and Infeasible, solution in terms of the termination of simplex method.

Transportation and Assignment Problem: Mathematical formulation of TP, Initial Basic feasible Solution: North-West Corner-Method (NWCM), Least Cost Method (LCM), Vogel's Approximation Method (VAM), Testing for Optimality and finding Optimum solution by Modi Method, Mathematical formulation of AP, Solving Assignment problem by Hungarian Method

Games Theory and Sequencing Problems: Introduction of Theory of Game, Two-Person Zero-Sum Game Rules to determine the Saddle point and Games with Saddle, point(Pure Strategies), Notations, Terminology and assumptions of Sequencing Problems, Processing n jobs through two Machines and n jobs through m Machines, Processing two jobs through m Machines

Project Scheduling (CPM and PERT): Introduction, Basic differences between PERT and CPM, Network Diagrams, Critical Path Method, PERT calculations.

Text Books:

1. Operations Research – Theory and Application, J. K. Sharma, 4th Edition, Macmillan Publishers India 2009
2. Operation Research an Introduction, Hamdy A. Haha, 6th Edition, Prentice Hall of India 2001

Reference Books:

1. Operational Research, P. K. Gupta, 3rd Edition, S. Chand and Co. 2006.
2. Introduction to Operations Research - A Computer oriented algorithmic approach, Gillet.B.E. McGraw Hill, 1987.

ITU704 INTERDISCIPLINARY ELECTIVE
(B) NANOTECHNOLOGY

Teaching Scheme : 03 L+ 00 T Total: 03 Credits : 03
Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE Total Marks :100
Duration of ESE: 2hrs.30min.

Introduction : Background and definition of Nanotechnology, Top-down & Bottom -up approaches to nanotechnology, Major fields of nanotechnology.

Properties of Nanoscale structure : Brief idea about Crystal structure and defects, Solid disorder Nanostructure Failure mechanism of conventional grain sized materials, Its different properties, Metal Nanocluster composite, poros Silicon, Effect of size dependence on electrical properties, Magnetic properties, Mechanical properties Hall-Petch relation, Chemical properties.

Quantum Well, Wires, Dots : Preparation of Quantum nanostructure, quantum size effect, Conduction Electrons and Dimensionality, Femi gas and Density of states, Potential well, Partial confinement, Properties Dependent on Density of states, Exitrons Single electron tunneling, Applications Infra red detectors, Quantum dot laser, Spintronics.

Carbon Nanotubes : Introduction, fabrications Structure, Electrical properties, Mechanical properties, Vibrational properties, Applications of CNT.

Technique of Nanomaterials Fabrication & Methods of measuring properties : Mechanical & Chemical approaches, Inort gas Condensation, high energy ball miling, , Sol-gel, Pulse Laser deposition, Chemical vapour deposition, Brief discussion of Scanning Electron Microscopy (SEM), Transmission Electron Microscopy TEM , X-ray Diffraction (XRD).

Nanomachines : Microelectromechanical System (MEMSs) : Intoduction to Micro/Nano sensor and actuator, Materials and Fabrication Oxidation on Si, Lithography, Photoresist, Etching surface micro/nanomachining.

Introduction to Nanomedicine : Medical Applications of Nanomaterials: drug delivery, Cancer, Surgery, Nano robots, Cell repair etc

Text Books :

1. Introduction to Nanotechnology , C.P. Poole (Jr) & F.J. Owens, - John Villy & Sons, Publication.,2006.
2. Nanotechnology: Principles and Practices , S. K. Kulkarni, Capital Publishing Co.,2007.

Reference Books :

1. Principle of Nanotechnology, Edited by Bharat Bhusan, Spinger Verlag ,2003.
2. Introduction to Nanoscience & Nanotechnology, G. L. Hornyak, H. F. Tibbals, J. Dutta, J. J.Moore, CRC Press, New York,2009.

ITU704 INTERDISCIPLINARY ELECTIVE
(C) SOFTWARE ENGINEERING

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Introduction : Introduction to Software Engineering.

Software Development Life-cycle: Requirements analysis, software design, coding, testing, maintenance, etc.

Software Requirements Specification : Waterfall model, prototyping, interactive enhancement, spiral model. Role of Management in software development.Role of metrics and measurement.Problem analysis, requirement specification, validation, metrics, monitoring and control.

System Design : Problem partitioning, abstraction, top-down and bottom-up design, structured approach. Functional versus object-oriented approach, design specification and verification metrics, monitoring and control.

Coding : Top-down and bottom-up, structured programming, information hiding, programming style, and internal documentation. Verification, Metrics, monitoring and control.

Testing : Levels of testing functional testing, structural testing, test plane, test cases specification, and reliability assessment.

Software Project Management : Cost estimation, Project scheduling, Staffing, Software configuration management, Quality assurance, Project Monitoring, Risk management, etc.

Text Books:

1. Software Engineering: A Practitioner's Approach, Pressman R.S, 6thEdition, McGraw Hill, 2005.
2. The Unified modeling Language User Guide, Grady Booch, James Rumbaugh, Jacobson, 2nd Edition, Addison-Wesley, 2005

Reference Books:

1. Software Engineering, Ian Sommerville, 7th Edition, Pearson Education Asia, 2004.
2.An integrated approach to software engineering, Pankaj Jalote, 3rd Edition,Springer Science ,2005.

ITU705 COMPILER CONSTRUCTION LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

The course will have project where students will have to develop compiler for a subset of C language using tools like Lex and Yacc.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU706 MICROPROCESSOR AND INTERFACING LAB

Teaching Scheme : 02 P **Total: 02** **Credit : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks : 50**
Duration of ESE : 3hrs.

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1) To Study 8086 Microprocessor architecture in minimum mode and maximum mode.

2) To Study Methods of I/O interfacing and Timing Systems in minimum mode and maximum mode.

3) Sketch and explain the interface of PPI 8255 to the 8086 microprocessor in minimum mode. Interface 8 LEDs to the port B of 8255. Interface 8 keys to the port A. Write an 8086 assembly program to read the key status and output on to the 8 LEDs. Interface

an 8 bit ADC 808 to port A. Derive control signals from port C. Write an 8086 assembly program segment to read an analog signal.

4) Sketch and explain the interface of PPI 8255 to the 8086 microprocessor in minimum mode. Interface 8 LEDs to the port B of 8255. Interface 7-segment Display to port A. Derive control signals from port C. Write an 8086 assembly program segment to flash **WELCOME**

5) Sketch and explain the interface of PIC 8259 to the 8086 microprocessor in minimum mode. Show the cascading of additional eight 8259s to provide 64 external interrupts. Write an 8086 assembly program to initialize master 8259 and slaves.

6) Sketch and explain the interface of PIT 8254 to the 8086 microprocessor in minimum mode. Write an 8086 assembly program to generate a clock of 10 Hz on the OUT 0 pin. Write an 8086 assembly program to generate a hardware trigger able mono-shot of 1 msec pulse width

7) 8255 interfacing with 8086: Sketch and explain the interface of PPI 8255 to the 8086 microprocessor in minimum mode. Interface 8 LEDs to the port B of 8255. Interface 8 keys to the port A. Write an 8086 assembly program to read the key status and output on to the 8 LEDs. Interface an 8 bit DAC 08 to port A. Write an 8086 assembly program segment to output a ramp

8) To Study internal Architecture of 8237 DMA Controller.

9) Design and interface 8086 microprocessor and 8251 USART. Write a program for Transmit and receive 100 bytes of data in Asynchronous mode.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(A) DISTRIBUTED COMPUTING LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Ten Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1) Design and implement a very simple distributed file system.

2) Write a program to implement Remote Procedure Call.

3) Simulate Cristian's algorithm for clock synchronization.

4) Simulate Berkeley's algorithm for clock synchronization.

5) Simulate Lamport's algorithm for clock synchronization.

6) Simulate the Ring election algorithm.

7) Simulate the Bully election algorithm.

8) Simulate the Causal Consistency model.

9) Simulate the centralized algorithm for mutual exclusion.

10) Simulate the distributed algorithm for mutual exclusion.

11) Simulate the token ring algorithm for mutual exclusion.

12) Implement the Byzantine algorithm.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(B) OPTICAL AND SATELLITE COMMUNICATION LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Optical fiber cable as a light guide

2. Fiber optic cable transmission

3. Characteristics of connectors and splices

4. Index-matching procedures

5. Fiber optic transmitter

6. Receiver design

7. Fiber termination techniques

8. Investigate reflection, refraction and critical angle.

9. Measure wavelengths of light using the techniques of Young, Michelson and Lloyd

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(C) DIGITAL SIGNAL PROCESSING LAB

Teaching Scheme : 02 P **Total: 02** **Credit : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks : 50**
Duration of ESE : 3hrs.

Minimum Ten Experiments to be performed on following topics.
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.
1. Operation on Sinusoidal Sequence.
2. Operation on DTS.
3. Scaling Operation on DTS.
4. Shifting Operation on DTS.
5. Folding Operation on DTS.
6. Linear Convolution.
7. DFT Computation.
8. Magnitude and Phase Spectrum.
9. Poles and Zero's of Z
10. FFT Computation.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(D) EMBEDDED SYSTEM LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. NIOS II System and SDRAM Interface
2. Expanded NIOS II System
3. Study of Development Education Board
4. A Simple Computer Embedded System
5. Program Controlled Input Output
6. Subroutines and Stacks
7. Polling and Interrupts
8. Bus Communication

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(E) BIOINFORMATICS LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. To view and use the various biological databases available on the World Wide Web.
2. Queries based on Biological databases-To retrieve the gene sequence in FASTA format corresponding to Protein IDP00519
3. To retrieve the sequence of the Human keratin protein from UniProt database and to interpret the results.
4. To retrieve the sequence of the Human keratin protein from GenBank database and to interpret the results.
5. To find the similarity between sequences using Basic Local Alignment Search Tool (BLAST).
6. To perform Sequence analysis by using EMBOSS(European Molecular Biology Open Software Suite)
7. To search for a motif in a DNA sequence
8. To predict secondary structure of the give protein sequences

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU707 ELECTIVE-I
(F) MULTIMEDIA TECHNOLOGY LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. To create a Banner using Adobe Photoshop CS5.
2. Link two different pages from the same image using image map in Adobe Dream weaver CS5
3. Apply several transformation at same time on star tool using transform each command in adobe illustrator.
4. Create Animation with Twin Shape using Adobe Flash CS3 Professional.
5. To Move object along a Path using Adobe Flash CS5 Professional.
6. To create Frame by Frame animation in Adobe Flash CS5 Professional.
7. Create Powerful Motion with Simple Expressions in AE using Adobe after Effect.
8. Change one object into another using Adobe Flash CS3 Professional.
9. Perform isolated adjustments to an image using Graduated Filters in Adobe Photoshop Extended CS3.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU708 PROJECT PHASE I

Teaching Scheme: 04 P **Total: 04** **Credit: 02**
Evaluation Scheme: 50 ICA **Total Marks: 50**
Duration of ESE: 3hrs.

1 In general, a group of 3-6 students should be allowed to complete the project on Approved topic.
2 Preferably more than 25 % projects shall be Industry / Research based / oriented.
3 Exhaustive survey of literature based on a clear definition of the scope and focus of the topic should be carried out by the students.
4 Students should finalize the topic for the project after literature survey in consultation with the Guide.
5 The **Synopsis/Abstract** on the selected topic should be submitted to the Programme Head for approval.
6 On approval of the topic, students should initiate the topic based work.
7 Approximately more than 30% work (of the total quantum) should be completed by the end of VII semester.
8 At the end of semester, each batch should submit the progress report in following format:
Title
Introduction
Concept
Work completed
Work to be completed
References
9 For uniform and continuous evaluation, the Evaluation Committee comprising of the Guide, Project Course Coordinator and Expert appointed by the Program Head will award the marks based on the work completed by the end of semester and the presentation based on the project work.

Note:

ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the Project work and knowledge / skill acquired. Oral examination shall be conducted by the panel of examiners.

ITU709 SEMINAR

Teaching Scheme: 02 P **Total: 02** **Credit: 02**
Evaluation Scheme: 50 ICA **Total Marks: 50**
Duration of ESE: 3hrs.

1. Student shall select a topic for seminar which is **not covered in curriculum**.
2. Topics shall be registered within a month after beginning of VII Semester and shall be approved by the concerned guide and Program Head.
3. Students should know the functional and technical details of selected topic after carrying out the conceptual study.
4. Before the end of semester, student shall deliver a seminar and submit the seminar report in following format:
   Introduction
   Literature Survey
   Concept
   Functional and Technical Details
   Future scope
   Applications
   Comparison with similar topics / methods
   References
5. Student shall deliver a seminar based on submitted report. The presentation and oral examination on selected seminar topic shall be assessed by pannel of examiners

Note:

ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the Seminar Topic and the knowledge acquired. The seminar shall be assessed by the examiner panel consisting of Project Guide, Course Coordinator Seminar and Expert appointed by Program Head.

ITU710 INDUSTRIAL TRAINING/VISIT

Teaching Scheme: 00 **Total: 00** **Credit: 01**
Evaluation Scheme: 50 ICA **Total Marks: 50**

Industrial Training shall have an option of Industrial Visit.

Industrial Training: List of renowned industries shall be prepared by the Departmental Coordinator of T & P Cell for the course. After approval from the Principal and with the consultation of Industry personnel, 02 weeks trainings shall be arranged during the vacations (after the VI semester). The students may be permitted to undergo the trainings of 02 weeks as per their choices for which all the official formalities will be completed by the students under the guidance of course coordinator. The students shall submit the report based on the Industrial training to the course coordinator which will be evaluated during the VII semester

Industrial Visit: An Industry Visits to minimum three industries shall be arranged for the students unable to complete the Industrial Training. The visit shall be arranged preferably during the vacation period. However in non-availability of permission for the visit during vacation period, same may be arranged during the regular VII semester. The students will be required to submit the report based on the Industrial Visit which will be evaluated by the course coordinator

Note:

ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the training/visits and knowledge / skill acquired. The technical report submitted by the students shall be assessed, by the panel of examiners consisting of Project Guide, Course Coordinator and Expert appointed by the Program Head.

ITU711 INDUSTRIAL LECTURE- II*

Teaching Scheme: 01 L **Total: 01** **Credit: 01**
Evaluation Scheme: 25 ICA **Total Marks: 25**

List of renowned persons from industry shall be prepared by the Departmental Coordinator of T & P Cell for the course. After approval from the Principal, Minimum twelve Industrial lectures shall be arranged, preferably once a week, which shall be delivered by the experts/Officials from Industries/Govt. organizations/ Private Sectors/Public Sectors covering the various aspects.
The assignments based on the Industry Lecture-I and Industry Lecture-II will be evaluated during VII semester

Topics of Industrial Lectures shall be Technical in nature and should not be the specific contents from the curriculum.

Students shall submit the report based on lectures.

Note:

ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the lectures and knowledge acquired. The technical report submitted by the students shall be assessed, by the panel of examiners consisting of Project Guide, Course Coordinator and Expert appointed by the Program Head.

ITU712 SELF STUDY III

Teaching Scheme: 00 L **Total: 00** **Credit: 02**
Evaluation Scheme: 25 TA **Total Marks: 25**

1] Self study - III is based on one class test each on the basis of 20% curriculum of the courses ITU701,ITU702,ITU703 declared by respective course coordinator at the beginning of the semester

2] One faculty member shall be appointed as course coordinator for Self Study - III and his/her work load shall be considered as 1 hr/week.

ITU801 DATA WAREHOUSING AND DATA MINING

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Data ware house and OLAP Technology for data mining: Data ware house, multidimensional data model, data ware house architecture, data ware house implementation.

Data mining: Data mining functions, classification and major issues. Data Preprocessing Data cleaning, data integration and transformation, data reduction, discrimination & concept hierarchy generation.

Data mining primitives: Concept, Data mining query language. Concept description: data generalization, Analytical characterization, mining class comparison.

Classification and Prediction: What is classification? What is prediction? , Issues regarding classification and prediction, Classification by decision tree induction, Bayesian classification, Classification by back propagation, k-nearest neighbor classifiers.

Cluster Analysis: What is cluster analysis?, types of data in clustering analysis, a categorization of major clustering methods, partitioning methods, hierarchical methods, model based clustering methods, outlier analysis.

Application and trends in data mining: Data mining applications, data mining systems and research prototypes, additional themes on data mining, trends in data mining.

Text Books:

1. Data Mining Concepts and Technique's, Han and M.Kamber, 1st edition, Elsevier Pub. Indian Reprint, 2004.
2. Data Ware Housing, Data Mining and OLAP, Berson, 2nd Edition, Tata McGraw- Hill, 2004.

Reference Books:

1. The Data Ware House Life Cycle Tool Kit, R. Kimball , 1st Edition, Wiley Press, John Wiley and Sons (ASIA) Pvt. Ltd,2001.
2. Data Mining Techniques, Arun K. Pujari, 2nd Edition, University Press (Orient Longman), 2003

ITU802 NETWORK ADMINISTRATION AND SECURITY

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits : 03**
Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks :100**
Duration of ESE: 2hrs.30min.

Introduction to Network Security: passive and active attacks, authentication, integrity, access control, The model of internet work security, internet standards: internet society and RFC publications.

Cryptography: Encryption principles and various algorithms, standardization process, key distribution, public key cryptography and message authentication, digital signature. Network security applications: Kerberos, X.509 directory authentication services, e-mail security PGP (Pretty Good Privacy), operational description. MIME (Multipurpose Internet Mail Extensions), SMIME (Security/Multipurpose internet mail extensions) functionality.

IP Security: Overview, IP security architecture, Authentication header, Web Security: Web security requirements, secure socket layer, Transport layer security, Secure electronic transactions.

Network Management Security: Basic concepts of SNMP, Network management architecture and protocol architectures, proxies, services, SNMPv1 authentication service, access policy and proxy service, SNMPv2 architecture, message processing and user security model, view based access control.

System Security: Intruders, Intrusion technologies, password protection, password selection strategies, Intrusion detection.

Viruses and related threats: Nature of viruses, types, micro viruses and various antivirus approaches.

Firewall: Characteristics, types of firewalls, Firewall configuration, Trusted systems, data access control, the concept of the trusted systems.

Text Book :

1. Network Security Essentials, William Stallings,3rd edition, Prentice Hall India,2006.
2. Cryptography and Network Security, Atul Kahate, 2nd Edition, Tata McGraw-Hill Publishing Company Ltd., 2008

Reference Books:

1. Security for Telecommunication and Network management, Moshe Rozenblit, 1st Edition, Prentice Hall India, 2000.
2. Internet Security Protocols - Protecting IP Traffic, Uyless Black, 1st Edition, Pearson 2005

ITU803 ELECTIVE-II
(A) ARTIFICIAL NEURAL NETWORK

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Introduction To Neural Network : History of Neural Networks, Biological Neural Networks, Artificial Neuron, Analysis of Neural networks, Characteristics of Neural Networks ,Limitations of Neural Networks, Neural Network Applications.

Perceptron:-Overview of Perceptron ,Pattern Recognition, Mathematical modeling of Simple Perceptron ,Perceptron Learning Algorithms ,Limitations of Perceptron.

Multi-Layer Perceptron Networks: Delta Learning Rule for the Output Layer, Generalized Delta Learning Rule, Backpropagation learning algorithm, Mathematical modeling of MLP Networks ,Application to Function Approximation.

Radial Basis Function (Rbf) Networks: Least Square Estimator, Linear Neuron, Recursive Least Squares Algorithm, Basis Function Networks, Radial Basis Function Networks ,RBF as Interpolation Networks ,Generalized RBF as Approximation Networks, MLP vs. RBF Networks as Function Approximators .

Hopfield Networks: Hopfield Network, Energy Minimizing Networks, Analysis and Mathematical modeling of Hopfield Model, Designing Stable States (Energy Wells), Application to Optimization Problems .

Associative Memory Networks: Linear Feed forward Associative Memory Network, Recurrent Associative Memory Network,Bidirectional Associative Memory Network (BAM) ,Brain-State-in-a-Box (BSB) Network ,Cross-Talk versus Perfect Recall.

Kohonen Networks: Self-Organization in Human Brain,Self-Organizing Neural Networks, Kohonen's Neural Network, Kohonen Learning Rule ,Self-Organizing Feature Maps, Vector Quantization ,Application to Data Compression.

Text Books :

1. Introduction to Artificial Neural Systems, Zurada, Jacek M.,1st Edition West Publishing Company, 1992.
2. Neural Networks, Simon Haykin, 1st Edition,MacMillan College Publishing Company, 1999.

Reference Books:

1. Artificial Neural Networks, Robert J. Schalkoff, 2nd Edition,McGraw-Hill, 1997
2. Neural Networks for Pattern Recognition , Christopher M. Bishop ,1st Edition Oxford University Press, Oxford UK , 1995.

ITU803 ELECTIVE-II
(B) ADVANCED WEB TECHNOLOGY

Teaching Scheme : 03 L+ 00T Total: 03 Credits : 03
Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE Total Marks :100
Duration of ESE: 2hrs.30min.

Introduction: Introduction to Microsoft .Net Framework, Building blocks in .Net**,** Drawback of previous languages. **C#.Net :** C#.Net overview, Types of application architecture,.Net initiative,.Net framework: components of .Net framework, Advantages ,requirement of .Net,Features,C#.Net IDE, Data Types, Loops, Control structures, Cases, Operators, Creating forms, Procedures and functions, Form controls, Implementation of OOP**,** Creation of class and objects, Inheritance, Constructors**,** Exception handling.

Component based programming: Working with Private assembly, shared assembly, Using COM components developed in C# or other language.

ADO.Net: Introduction to ADO.Net**,** database, Writing XML file.ADO.Net architecture, Creating connection, Dataset and Data reader, Types of Data adapter and ADO controls, reading data into dataset and data adapter, Binding data to controls, Data table and Data row.

Accessing and manipulating data with ADO.net: Selecting data, Insertion, deletion, updating, sorting, How to fill dataset with multiple tables, Multi-threading, Working with multithreading, Synchronization of Threads.

ASP.Net: Difference between ASP and ASP.Net, Introduction to IIS, ASP.Net IDE. Creation of web forms, Using web form controls.

ASP.Net objects and components: Response, Server, Application, Session, ASP.Net scope, state, view state, post back and configuration, Object creation, Scripting, Drive, folder, file,Server components, Ad rotator, Content linker, Browser capabilities, Use and creation of global .asax file, Using Application object, Events methods and collection, Using session object , enabling and disabling of session, Event, properties, methods, collection.

ADO.Net in ASP.Net: Connection, Dataset and data reader, Data table and Data row, Web.config introduction, Binding data with data grid, Accessing and manipulating data, Server control templates and Data binding techniques, Understand data access in .Net using ADO.Net, Understand various Server Control Templates available for Data Binding like Repeater, Data List and Data Grid Controls.

ASP transactions and e-mail: Transactions, Transaction db design, CDONTS object. Email sending web page creation.

Text Books:

1. Mastering Visual C#.net ,Jason Price & Mike Gaderlay, Paperback Edition, Sybex Publication, 2008.
2. C# , A Beginners Guide , Herbert Shildt , 1st Edition ,Osborne/McGraw Hill Publication, 2008.

Reference Books:

1. Programming in C#, Balguruswami, 2nd Edition, TMH, 2007
2. ASP.net 3.5 : A Beginners Guide, Sanders & William, 1st Edition, TMH,2008

ITU803 ELECTIVE-II
(C) SOFTWARE PLANNING AND MANAGEMENT - OBJECT ORIENTED APPROACH

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Basics of Software Planning & Management Concepts: Overviews of latest trends in software industry, software industry working environment, Case study regarding understanding of software industry set-up, Management practices prevalent in software industry, Introduction to use of object oriented concepts in software development

Project Scheduling Concepts: Concepts, Task set and Network, Scheduling, Software Quality concepts, Software Quality Assurance, Case Study on Project scheduling

Software Development Reviews: Software reviews, Formal Technical reviews, Software reliability, Software Quality Assurance Plan, Case study on SDR

Object Orientation in SPM: Models, Relationships, UML, Software Engineering practices, Use case Analysis, Architectural Analysis, Design Analysis

Workflows: Use case Model, Class Diagram, Object Diagram, Interaction Diagrams, sequence and collaboration diagram, Activity Diagram

Text Books:

1.Software Engineering: A Practitioner's Approach, Pressman R.S, 6th Edition, McGraw Hill, 2005.
2. The Unified modeling Language User Guide,Grady Booch, James Rumbaugh, Jacobson, 2nd Edition, Addison-Wesley, 2005
3. An Integrated Approach to Software Engineering: Pankaj Jalote, Springer Publication, 2005

Reference Books:

1. Software Engineering, Ian Sommerville, 7th Edition, Pearson Education Asia, 2004
2.Classical and Object Oriented Software Engineering ,Steve Schach,6th Edition, McGraw Hill International, 2005
3.Object-Oriented Analysis and Design with Applications ,Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young Ph.D., Jim Conallen, Kelli A. Houston, 3rd Edition, Addison Wesley Professional, 2007
4. A Concise Introduction to Software Engineering: Pankaj Jalote, Springer Publication, 2008

ITU803 ELECTIVE-II
(D) COMPUTER GRAPHICS

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 04**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE : 2hrs.30min.

Computer Graphics and Graphics System : Video display devices, Raster-Scan systems, Random-Scan systems, Graphics monitors and workstations, input devices, hard copy devices, Graphics software.

Output primitives: Point and Lines, Line drawing algorithms, loading the frame buffer, line function, circle and ellipse generating algorithms, curves, parallel curves algorithms, Pixel addressing, filled-area primitives, functions, Cell array, character generation.

Attributes of output primitives: Line and curve attributes, color and grayscale levels, area fill attributes. Character attributes, bundled attributes, anti aliasing.

2-D geometric transformations: basic transformations, matrix representations, Composite Transformations, other transformations, transformations between coordinate Systems, Affine transformations, transformation functions, Raster methods for transformations.

Two-Dimensional viewing: viewing coordinates, Window-to-view port coordinate transformation, viewing functions, clipping : point, line, polygon, curve, text, exterior.

Structures and hierarchical modeling: concepts, editing structures, basic modeling concepts, hierarchical modeling, GUI and interactive input methods : the user dialogue, input of graphical data, functions, initial values for input device parameters, interactive picture - construction techniques, virtual reality environments.

Three dimensional concepts: display methods, graphics, Bezier curves and surfaces, Bspline curves and surfaces, Beta-splines, Three dimensional geometric and modeling transformations : translation, rotation, scaling, three dimensional viewing : viewing pipeline, viewing coordinates, projections.

Text Book :

1.Computer Graphics ,D. Hearn, M.P.Baker , 2nd edition ,Pearson Education,1997.

References :

1. Computer Graphics Using Open GL ,F.S.Hill, 2nd edition, Pearson Education,2001.
2. Principles of Interactive Computer Graphics, W.M.Newman & R.F.Sproul, 2nd edition, McGraw Hill,1979.

ITU803 ELECTIVE-II
(E) DIGITAL IMAGE PROCESSING

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Introduction: Origin and application of DIP, Fundamental steps and components of an IP system, Elements of visual perception, Light and EM spectrum, Image sensing, acquisition, sampling and quantization, Basic relationships between pixels.

Spatial Domain Image Enhancement: Gray level transformations, Histogram processing. Enhancement using arithmetic/logic operations, Basics of spatial filtering, Smoothing spatial filters, sharpening spatial filters, combined methods.

Frequency Domain Image Enhancement: Fourier transform and the frequency domain, Smoothing frequency domain filters, Sharpening frequency domain filters, Homomorphic filtering, Implementation of 2-D Fourier transforms , FFT.

Image restoration: Noise models, Restoration in the presence of noise only- spatial filtering, Periodic noise reduction by frequency domain filtering, Linear, Position Invariant degradation, Estimation of degradation function, Inverse filtering, Wiener filtering. Constrained LS filtering.

Geometric transformations: spatial & gray level interpolation.

Text-Book:

1) Digital Image Processing, Gonzalez, R.C. & Woods R.E., 2nd Edition, Pearson Education, 2004.
2) Digital Image Processing & Computer Vision, Schalkoff R.J, John, 2nd Edition, Wiley & Sons, 2005.

Reference Books:

1) Digital Image Processing, Pratt W.K., 3rd Edition, John Wiley & Sons, 1991.
2) Computer Vision and Image Processing: A Practical Approach Using CVIPtools, 1st Edition, Prentice Hall, 1998.

ITU804 ELECTIVE-III
(A) ARTIFICIAL INTELLIGENCE

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Overview of Artificial Intelligence: Knowledge, General concept,

Introduction to LISP: Syntax and numerical functions. Basic list manipulation function in LISP, Functions, predicates and conditional Input, output and local variables, iteration and recursion, Property list and arrays. Implementation using Prolog.

Knowledge representation - I: Syntax and semantics for propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to clausal form, Inference fuels, the resolution principle, Nondeductive inference methods, Representation using rules.

Knowledge representation - II: Truth maintenance system, Default reasoning and closed world assumption, Predicate completion and circumscription, model and temporal logics, Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.

Knowledge organization and manipulation: Preliminary concept, Examples of search problems, Uniformed and blind search, Informed search, Searching AND-OR graphs, structure used in matching.

Measures for matching: distance matrices, qualitative measures, similarity measures, Partial matching, Indexing and retrieval technique, integrating knowledge in memory, Memory organization system.

Knowledge Acquisition: General concept in knowledge acquisition, learning by Induction, Analogical and explanation based learning: Analogical learning and reasoning, Explanation and learning.

Expert system: Architectures, Rules based system architecture, Nonproductive system architecture, Dealing with uncertainty, Knowledge acquisition and validation, Knowledge system building tools.

Text Books

1. Artificial Intelligence, P.H.Winston, 2nd Edition Addison- Wesley Publication Company, 1984.
2. Introduction to Artificial Intelligence E.Charniac and D.McDermott, 2nd Edition, Addison-Wesley Publishing Company, 2002.

Reference Books

1. Introduction to expert systems, Peter Jackson, 3rd Edition, Addison-Wesley Publishing Company, 1986.
2. Artificial Intelligence, E.Rich, K.K.Knight,2nd Edition, Tata McGraw Hill, New Delhi, 1991.

ITU804 ELECTIVE-III
(B) NATURAL LANGUAGE PROCESSING

Teaching Scheme : 03 L+ 00T **Total: 03** **Credits : 03**
Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks :100**
Duration of ESE: 2hrs.30min.

Sound : Biology of Speech Processing; Place and Manner of Articulation; Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

Words and Word Forms : Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields.

Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

Meaning : Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Coreferences.

Web 2.0 Applications : Sentiment Analysis; Text Entailment; Robust and Scalable Machine Translation; Question Answering in Multilingual Setting; Cross Lingual Information Retrieval (CLIR).

Text Book:

1. Natural Language Understanding, Allen, James, 2nd Edition, Benjamin/Cumming, 1995.
2. Natural language processing: a Paninian perspective, 1st Edition, Vineet. Chaitanya, Rajeev Sangal, Akshar Bharati, Prentice-Hall Of India Pvt. Limited, 1996

Reference Books:

1. Speech and Language Processing, Jurafsky, Dan and Martin, James, 2nd Edition, Prentice Hall, 2008.
2. Foundations of Statistical Natural Language Processing, Christopher and Heinrich, Schutze, MIT Press, 1999.

ITU804 ELECTIVE-III
(C) FUNCTIONAL AND LOGIC PROGRAMMING

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs. 30min.

Propositions : Fully parenthesized propositions, Evaluation of constant propositions, Evaluation of proposition in a state. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English to prepositional form

Reasoning Using Equivalence Transformations : The laws of equivalence, rules of substitution and transitivity, formal system of axioms and Inference rules. NATURAL **Deduction System**: Introduction to deductive proofs, Inference rules, proofs and sub-proofs, adding flexibility to the natural deduction system and developing natural deduction system proofs.

Predicates : Extending the range of a state, Quantification, Free and Bound Identifiers, Textual substitution, Quantification over other ranges and some theorems about textual substitution and states.

Logic Programming : Introduction to prepositional and predicate calculus, First-order predicate calculus, Format logical systems, PROLOG programming-Facts, Rules and queries, Implementations, Applications, Strengths and Weaknesses.

Functional Programming : Introduction to lambda calculus-Syntax and semantics, Computability and correctness. Features of Functional Languages-Composition of functions, Functions as first-class Objects, no side effects and clean semantics, LISP Programming-Data types and structures, Scheme dialect, primitive functions, functions for constructing functions and functional forms. Applications of functional languages and comparison of functional and imperative languages.

Text Books:

1. The Craft of Functional Programming, S. Thompson, Haskell, 2nd Edition, Addison-Wesley, 1999.
2. The Implementation of Functional Programming Languages, S. L. Peyton Jones, Prentice Hall, International Series in Computer Science, 1987.
3. The Art of Prolog: Advanced Programming Techniques, L. Stirling and E. Shapiro ,2nd Edition, MIT Press, 1994.

References:

1. Elements of Functional Programming, C. Reade, Addison-Wesley, 1989.
2. The Lambda Calculus: Its Syntax and Semantics, H. Barendregt ,North Holland, 1984.
3. Foundations of Logic Programming, J. W. Lloyd, Springer Verlag, 1987.

ITU804 ELECTIVE-III
(D) PARALLEL COMPUTING

Teaching Scheme: 03 L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs.30min.

Scalability and Clustering: Evolution of Computer Architecture, Dimensions of Scalability, Parallel Computer Models, Basic Concepts Of Clustering, Scalable Design Principles,

Parallel Programming Overview, Processes, Tasks and Threads, Parallelism Issues, Interaction / Communication Issues, Semantic Issues in Parallel Programs.

Enabling Technologies: System Development Trends, Principles of Processor Design, Microprocessor Architecture Families, Hierarchical Memory Technology, Cache Coherence Protocols, Shared Memory Consistency, Distributed Cache Memory Architecture, Latency Tolerance Techniques, Multithreaded Latency Hiding.

System Interconnects: Basics of Interconnection Networks, Network Topologies and Properties, Buses, Crossbar and Multistage Switches, Software Multithreading, Synchronization mechanisms.

Parallel Programming: Paradigms and Programmability, Parallel Programming Models, Shared Memory Programming.

Message Passing Programming: Message Passing Paradigm, Message Passing Interface, Parallel Virtual Machine.

Text Books:

1.Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, 2nd Edition, Addison Wesley,2003.
2.An Introduction to Parallel Algorithms, Joseph JaJa, Addison Wesley, 1992.

Reference Books:

1. The Sourcebook of Parallel Computing, Jack Dongarra, Geoffrey Fox, Ken Kennedy, Linda Torczon, William Gropp, 1st Edition , Berkeley Publication,2003.
2. Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes**,** F. T. Leighton, 1st Edition, Morgan Kaufmann Publishers, CA 1992.
3. Analysis and Design of Parallel Algorithms, Laxmivarahn and Dahl**,** 1st Edition,

ITU804 ELECTIVE-III
(E) HIGH PERFORMANCE NETWORKS

Teaching Scheme: 03L+ 00T **Total: 03** **Credits: 03**
Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE: 2hrs. 30min.

Network Performance Analysis : Objectives and requirements for Quality of Service (QoS) in high performance networks. Architecture of high performance networks (HPN), design issues, protocols for HPN, VHF backbone networks, virtual interface architectures, virtual interface for networking, High-speed switching and routing - internet and PSTN IP switching techniques, SRP protocols, SRP authentication, and key exchange, comparison of TCP/IP, FTP, TELNET, queuing systems, network modeling as a graph.

Gigabit Ethernet : Architecture, standards, interface, applications, network design.

High speed networks :

Frame relay: Frame relay protocols and services, frame relay congestion control.

ATM: Architecture, protocol, switching, traffic and congestion control, flow control, error detection and control, traffic management, ATM service categories, ATM in LAN environment, classical IP over ATM.

ISDN: ISDN overview, interfaces and functions, physical layer, Network layer, ISDN services.

B-ISDN: Driving forces and need, B-ISDN standards and services, B-ISDN Functional Architecture, B-ISDN Transmission structure, B-ISDN protocol architecture.

ADSL and DSL Technologies : Background and technological capabilities, Standards and associations, Architecture, Conceptual overview of VDSL, Deployment Case study, Market status and future.

Fiber Optics Communication : GPON (Gigabit capable Passive Optical Network), SONET/SDH and comparison with other available standards, SAN (Storage Area Networks) and Fiber Channel, DWDM, and CWDM.

Wireless Networks : Overview of GSM & CDMA, 3G mobile technologies, UMTS, EDGE, WiFi, WiMax.

Text Books:

1. ISDN and Broadband ISDN, William Stallings, 4th Edition, Pearson Education, 2001.
2. Computer Networks, Tanenbaum,5th Edition,PHI,2000.

Reference Books:

1. Mobile Communications, Jochen Schiller,Addison Wesley,2nd Edition, Pearson Education ,2003.
2. Telecommunication Network Protocol Modeling And Analysis:,M Shwartz, Addison Wesley ,2007.
3. Data Networks, Gallangar ,2nd Edition, Prentice Hall,1992.
4. Data Communication Computer Networks, And Open Systems, Fred Halsall,4th Editon, Addison Wesley,2000
5. Telecommunication Network Design Algorithms, Kershanbaum ,MGH.
6. High Speed Networks, William Stallings,4th Edition, Pearson Education,2000.

ITU805 DATA WAREHOUSING AND DATA MINING LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.
Aim of the list is to inform about minimum expected outcomes.

1. Implementation of Binning Methods for DATA SMOOTHING
2. Implementation of MIN/MAX normalization and Z-SCORE normalization.
3. Write a program for finding MEAN and MEDIAN of the given Data Set.

   DATA SET-(4,8,9,15,21,21,24,25,26,28,29,34)
4. Generate/Prepare HISTOGRAMS for given data using STATISTICA software.

   DATA SET-(1,1,5,5,5,5,5,8,8,10,10,10,12,14,14,14,15, 15, 15, 15, 15, 15,18, 18, 18, 18, 18, 18, 18, 18,20, 20, 20, 20, 20, 20, 20,25, 25, 25, 25, 25,28,28,30,30,30)
5. Prepare Regression Analysis of User Data Set using STATISTICA software.(linear &non linear)
6. Implement the STAR Schema of a DATAWAREHOUSE for Sales (Consider one example).
7. Implementation of K-MEANS algorithm for Clustering.

8. Prepare Correlation analysis using CHI-SQUARE method in STATISTICA software using given Data set
9. Write a program for calculating Term Frequency and Inverse Document Frequency for given table.
10. Write a program for predicting a class Label using Naïve BAYSIAN Classification for a given data set

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU806 NETWORK ADMINISTRATION AND SECURITY LAB

Teaching Scheme : 02 P **Total: 02** **Credits : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks :50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of program is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same .Aim of the list is to inform about minimum expected outcomes of course ITU806- Network Administration & Security.

1. Write a program to simulate RSA algorithm to encrypt and decrypt the data.
2. Write a program for Hamming Code generation for error detection and correction
3. Write a program for congestion control using Leaky bucket algorithm.
4. Program to read the source code of the web page and IP address of website.
5. Write programs to encrypt/decrypt messages with secret-key encryption algorithm using different ciphers and modes.
6. Write programs to generate one-way hash value and Message Authentication Code (MAC) for a message.
7. write programs to create secure channels using Public-Key encryption and Public-Key Infrastructure (PKI).
8. Write a program to Obtain The Information About The (A) Host (B) Network (C) Protocols (D) Domains.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU807 ELECTIVE-II
(A) ARTIFICIAL NEURAL NETWORK LAB

Teaching Scheme : 02 P **Total 02** **Credit : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks : 50**
Duration of ESE: 3hrs.

The sample list of programs is given below. This list can be used as guideline for Problem statements but the scope of the laboratory should not be limited to the same.
Aim of the list is to inform about minimum expected outcomes.

1. Regression Analysis
2. The Back Propagation Algorithm
3. Multilayer Perceptions
4. Radial Basis Function Networks
5. Over-learning and Generalization
6. Probabilistic Neural Networks
7. Generalized Regression Neural Networks

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU807 ELECTIVE-II
(B) ADVANCED WEB TECHNOLOGY LAB

Teaching Scheme : 02 P **Total: 02** **Credit : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks : 50**
Duration of ESE : 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.
1. Introduction to .Net framework.
2. a) Design Login form with validation.
   b) Design Registration form with validation of email address, date of birth,blank field, telephones and mobile numbers etc.
3. Design form, make it a class, create its object and access it from another form.
4. Design student class, marks class, inherits it in result class and access it using form.
5. Create instance of class using new operator of above example.
6. Design mark sheet of student using XML file and dataset.
7. Design employee details with help of database (back-end) using data adapter,data reader and datasets. Use data grid to display result.
8. Generation of database (data table) of employee or student with help of data tables of .Net.
9. To use multiple table design example of employee and department.
10. Design registration form of college using text box, text area, radio list, check list,button etc. using Autopostback property.
11. Simple application for following function: (1) Login (2) Surfing (3) Logout taking into considerations (Application, Session, Server object, global .asa file and their events, methods and collection) also demonstrates enabling and disabling of session.)
12. Creation of file, entry, reading data from a file.

13. Using components create:
    (1) Advertisement (using Ad rotator)
    (2) Book example (using Next function)
    (3) find capabilities of browser (Browser object capabilities)
14. Online application (student, employee, product, shopping mall)
    (a) Using dataset, data reader.
    (b) Same application using data table and data row. (use data grid to display data)
    (c) Bind the data to data grid using properties / templates.
    (d) Display details (student, employee, product)

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU807 ELECTIVE-II
(C) SOFTWARE PLANNING AND MANAGEMENT -OBJECT ORIENTED APPROACH LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Draw one or more Use Case diagrams for capturing and representing requirements of the system. Use case diagrams must include template showing description and steps of the Use Case for various scenarios.
2. Draw one or more Package diagram to organize and manage your large and complex systems as well as their complex models.
3. Draw activity diagrams to display either business flows or like flow charts.
4. Draw basic class diagrams to identify and describe key concepts like classes, types in your system and their relationships.
5. Draw advanced class diagrams to depict advanced relationships, other classifiers like interfaces.
6. Draw sequence diagrams OR communication diagrams with advanced notation for your system to show objects and their message exchanges.
7. Draw state machine to model the behavior of a single object, specifying the sequence of events that an object goes through during its lifetime in response to events.
8. Draw component diagrams assuming that you will build your system reusing existing components along with a few new ones.
9. Draw deployment diagrams to model the runtime architecture of your system

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU807 ELECTIVE-II
(D) COMPUTER GRAPHICS LAB

Teaching Scheme : 02 P **Total: 02** **Credit : 01**
Evaluation Scheme : 25 ICA + 25 ESE **Total Marks : 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.
Aim of the list is to inform about minimum expected outcomes.

1. Program to draw line using DDA algorithm for all quadrants.
2. Program to draw line using Bresenham's algorithm for all quadrants.
3. Program to draw a Circle drawing using DDA and Bresenham algorithms.
4. Program for Polygon Filling using Flood and Boundary fill algorithm
5. Procedure to rotate a wheel
6. Implement 2D transformations with translation, rotation, reflection, shearing and scaling.
7. Program For Line clipping using Cohen-Sutherland algorithm
8. Program For Polygon clipping
9. Construct Bezier curves and Spline curves with 6 or more control points entered through mouse.
10. Animation using Segmentation.

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU807 ELECTIVE-II
(E) DIGITAL IMAGE PROCESSING LAB

Teaching Scheme: 02 P **Total: 02** **Credit: 01**
Evaluation Scheme: 25 ICA + 25 ESE **Total Marks: 50**
Duration of ESE: 3hrs.

Minimum Eight Experiments to be performed on following topics
The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Write a MATLAB program to convert Gray scale image to negative.
2. Write a MATLAB program Log Transformation of image
3. Write a MATLAB program for Contrast stretching using piecewise Transformation
4. Write a MATLAB Program to eliminate Gaussian noise using Average Filtering
5. Write a MATLAB program to eliminate Paper and Salt noise with the help of Avg. Filtering.
6. Write a MATLAB program for enhancing an image using Laplacian filter
7. Write a MATLAB program to find bit planes of a given image

8. Write a MATLAB program Histogram Equalization

ICA – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.
ESE- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

ITU808 PROJECT PHASE-II

Teaching Scheme: 06 P **Total: 06** **Credit: 06**
Evaluation Scheme: 75 ICA + 100 ESE **Total Marks: 175**
Duration of ESE: 3hrs.

1. Project work decided in VII semester shall be continued.
2. Students should complete implementation of ideas given in synopsis, so that project work should be completed before end of semester.
3. Students shall submit the final project report in proper format as per guidelines given on the college website which shall include the work of both semesters.
4. For uniform and continuous evaluation, evaluation committee for each group shall be formed by Program Head in which guide must be a member. Internal marks should be awarded by committee at the end of semester based on continuous evaluation.
5. Final examination of project shall include demonstration, presentation of complete work and oral examination based on the project work.

Note:
ICA: The Internal Continuous Assessment shall be based on the active participation of the students in the Project work and knowledge / skill acquired. Oral examination shall be conducted on the Project report, by the panel of examiners consisting of Project Guide, Course Coordinator and Expert appointed by Program Head.

ESE: The End Semester Examination for Project shall consist of Demonstration if any, presentation and oral examinations based on the project report.

ITU809 SELF STUDY IV

Teaching Scheme: 00 **Total: 00** **Credit: 02**
Evaluation Scheme: 25 TA **Total Marks: 25**

1] Self study - IV is based on one class test each on the basis of 20% curriculum of the courses ITU801,ITU802,ITU803 & ITU804 declared by respective course coordinator at the beginning of the semester

2] One faculty member shall be appointed as course coordinator for Self Study - IV and his/her work load shall be considered as 1 hr/week.