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.