

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- III (Computer Emgg.)

Semester – VI

B.E.III (CO) 6 th Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
					University Exam.		University Exam.	Tutorial	Cont. Evaluation	Total Marks	
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks			
Computer Network-I	ECC 601 CO	3	1	2	3	100	3	30	25	20	75
Computer Organization	ECC 602 CO	3	1	0	3	100	0	0	25	0	25
Automata & Formal Language	ECC 603 CO	3	1	2	3	100	3	30	25	20	75
Language Processor	ECC 604 CO	3	0	2	3	100	3	30	0	20	50
Advanced Microprocessor Systems & Application	ECC 605 CO	3	1	2	3	100	3	30	25	20	75
Digital Signal Processing	ECE 606 CO	3	0	0	3	100	0	0	0	0	0
TOTAL:		18	4	8	-	600	-	120	100	80	300
Total Contact Hours: 30						Total Marks : 900					

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ECC 601 CO : COMPUTER NETWORKS -1

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction : Data Communications, Computer Networking, Protocols, Protocols architecture, Network Standards.
2. Data Transmission , Encoding & Multiplexing : Analog & Digital transmission techniques; Digital data, Analog data and Spread Spectrum. Frequency Division Multiplexing, Time Division Multiplexing.
3. Data Link Control : Flow control, Error Detection, Error control, HDLC and other Relevant protocols.
4. Wide Area Networks : Switching concepts, routing, Circuit switching, Packet Switching & X.25, Routing & Congestion Control.
5. Local Area Networks : LAN architectures, IEEE 802 and OSI, Bus, Tree, Ring, Star LANs; LAN Systems, Ethernet (CSMA/CD), Token Ring, FDDI; Bridges & Routing.
6. Advanced Topics : ATM LANS , wireless LAN

Practical work shall be based upon the theory course.

References :

1. Tanenbaum A - Computer Networks, PHI, EEE, 2nd Edition, 1996.
2. Stalling W - Data & Computer Communications, PHI, EEE, 1997 ed.

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ECC 602 CO : COMPUTER ORGANIZATION

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

1. Basic computer organization and design : Introduction, Instruction code, Design of computer instructions, Timing and Control Design, Instruction execution. Input-Output Instructions. Interrupt, Design of Basic Computer.
2. Central Processor Organization : Processor bus organization, Arithmetic Logic Unit, Stack Organization, General Instruction Format, Addressing Modes in instructions set. Data transfer instructions, Data Manipulations Instructions, Program Control instructions, Microprocessor/Micro computer organization.
3. Micro program control organization : Conventional control/Micro Prog. control, Control memory, Address sequencing, Microprogram sequencer, Micro instruction format , Advantages & Applications.
4. Arithmetic processor Design : Introduction. Algorithm for addition, subtraction, Multiplication, Division for - Unsigned number, Signed magnitude numbers, 1's Complement numbers, 2's complement numbers, Floating point numbers. Decimal numbers, Processor configuration and design for different types of number representation , Design a micro programmed calculator.
5. Input output Organization : Peripheral devices, I/O interfaces, Synchronous data transfer , Asynchronous data transfer, software /hardware approach for data transfer, Direct memory access. Priority interrupt, I/O processor, Multiprocessor system organization.
6. Memory organization : Auxiliary memory, Microcomputer memory, Memory hierarchy, Associative memory, Virtual memory , semiconductor memories, cache memory, memory management hardware.
7. Parallel processing : Introduction to parallel processing, multiprogramming, time sharing, Pipeline processing, parallel processing with multiple CPUs and Functional units, Race conditions, Semaphores in process, Synchronization, Memory interleaving, RISC processor, SISC processors etc.

References :

1. Morris Mano - Computer Systems Architecture, 3rd Edition, PHI, 1997 reprint
2. Tanenbaum - Structured Computer Organization, PHI EEE, 1995 Reprint
3. Stallings- Computer Organization & architecture : Design For performance, PHI EEE ed, 4th Ed, 1997.
4. Hamacher - Computer Organization, McGraw-Hill IS ed, 1994 ed.

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ECC 603 CO : AUTOMATA & FORMAL LANGUAGES

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction : Basic : Mathematical objects : Sets, Logic, Functions, Relations, strings, Alphabets, Languages; Graphs & Trees; Mathematical Inductions : Inductive proofs, Principles; Recursive Definitions; Set Notation;
2. Finite Automata & Regular Expressions : Finite State systems, Regular Languages & Regular Expressions, The Memory required to Recognize a Language; Finite Automata; Nondeterministic Finite Automata, Kleen's Theorem; two-way Finite Automata, FA with output.
3. Properties of Regular sets : The Pumping Lemma for Regular sets, closure properties, Decision algorithms, The myhill-nerode Theorem,
4. Context Free Grammers : Definition, Derivation trees & Ambiguity, Motivation & Introduction, Simplification of CFg, Chomsky Normal form, Inherently ambiguous Cfls; The Chomsky Hierachy : Regular grammers, Unrestricted grammers, Context-sensitive languages, relations between classees of languages.
5. Pushdown Automata : definitions , Deterministic PDA, PDA and CFLs
6. Properties of CFLs : The Pumping Lemma, Closure properties, Decision algorithms.
7. Turing Machines : The TM Model , Church Turing thesis , Computable languages and functions, Techniques for TM construction , Modifications of TM , Tms enumerators , Restricted Tms.
8. Introduction to Recursive Function theory
9. deterministic Context-Free Languages : Normal forms, Closure of DCFLs, Predicting machines, Additional Closure properties of DCFLs, Decision Properties, LR (0) grammers.
10. Closure properties of Families of languages : Triios & Full trios, Generalized Sequential Machine mappings, Abstract families of languages, Independence of the AFL operations.
11. Highlights of Other Important Languages Classees : Auxiliary Pushdown Automata, Stack automata, Indexed languages, Developmental systems.

Refrences :

1. J E Hopcroft & J D Ullman - Introduction to Automata Theory , Languages & Computations, 1987 ed, 1995 reprint, Addison - Wesley Pub , narosa reprint.
2. John C Martin - Introduction to languages & the theory, languages & Computation , McGraw-Hill International ed, 1997.
3. Deniel A Cohen- Introduction to Computer Theory, John-Willey & Sons, 1990 Ed, Reprint 1994.

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ECC 604 CO : LANGUAGE PROCESSORS

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	0	Cont. Evaluation : 20 Examination : 30

1. Introduction to System software , utility Software , systems programming.
2. Assemblers : introduction , Cross assembler , Micro Assambler , Meta Assamble, Single pass Assambler , Two Pass Assambler , Design of Operation code table , Symbol table , Literal table.
3. Macro processor : Introduction of Macros , macro processor design , Forward reference , Backward reference , positional parameters , keyword parameters , conditional assambly , Macro calls within Macros , Implementation of macros within Assambler . Designing Macro name table , Macro Defination table , Kew word parameter table , Actual parameter table , Expantion time variable storage etc.
4. Compilers : Introduction , Analysis of the programme , Lexical Analysis , syntzx analysis , phase of a compiler , Scanning , Parsing , Type checking and conversion , Storage organization and allocation strategies , Symbol tables , parameter passing , local and nonlocal variables , Intermediate code generation of decleration , Assignment statement. Boolean Expression , Conditional Statement etc ., Code generation , Code optimization , Compiler writing tools e.g. (Lex , Yacc) , Incremental Compiler , Interpreter.
5. Loader and Linkage Editor : Absolute Loader , Relocation - Relocating loader , Dynamic loader , Bootstrap loader , Linking loader , Program relocatibility , design of Absolute Loader , Design of direct - lonking editor , other loader scheme e.g. (Binders , Linking Loaders , Overlays , Dynamic Binders etc .)

Practical work shall be based upon the theory course.

References :

1. D.M. Dhamdhare : Systems Programming & Operating System , TMH Edition, 2 nd edition , 1996.
2. John J . Donovan : Systems Programming , McGraw-Hill International Edition, 1993 Reprint.
3. Houlb : Compiler Design in C , PHI , EEE , 1995.
4. Aho, Ullman: Compilers: Principles, Techniques and Tools, Pearson Education

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ECC 605 CO : ADVANCED MICROPROCESSOR SYSTEMS & APPLICATIONS

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction to advanced microprocessors : Typical requirements of advanced architecture : Batch Processing , Multiprogramming , Time sharing & Multitasking Systems ; Intel 8086 architecture , Internal Operation , Addressing Modes , Intel 8086/8088 Configurations-Minimum Mode and Maximum Mode , Intel 8086 System Connections , System Bus Timing , Intel 8086 Timing Parameters , Timing Diagrams & Trouble Shooting .
2. Intel 8086 Family assembly Language Programming : Program Development Stage , Programming with the use of Assembler and other Development Tools like Loader , Compiler , Locator , debugger , Assemble Instruction Format , Practice with Simple sequence Programs , Flags , jumps , etc . Implementation of Decision making , Multiple Branching and Iterative Looping Controls with Assembly Language instructions , String Instructions , Stack manipulation . Writing & Using Procedures , Macros & Debugging of Assembly Language Programs . Use of DOS / BIOS interrupts . Using C with Assembly language Programming .
3. Review of Peripheral Interfacing : Memory and I/O Addressing for Microcomputer Systems . Review of Intel 8255 Programmable Peripheral Interface , Intel 8251 Programmable Interface , programmable Parallel Ports with Timer/ Counter & RAM - INTEL's 8155 and 8156 . Programmable Timer/Counter & Clock Generator - INTEL's 8254 . Alphanumeric /Graphic LCD Displays Keyboard/Display controller - INTEL's 8270.
4. Interrupts Management : Intel 8086 interrupts , IVT , acknowledgment cycle , typical 8086 response . Different types of Interrupts , Interrupt Service Routines , TDR's , Block transfers and Interfacing DMAC - IC 8237 . Interfacing Floppy disk , Hard disk & Optical Disk : Controllers : Read / Write Logic circuits , Commands & Programming . Data Storage formats.
5. Intefacing typical PC Peripherals & thier programming : Printer Interfacing , PC - Keyboard Interfacing , CRT Terminals , CRT Controller - Intel 8275 , Motorola 6845 . Display Adapters - MDA , CGA , EGA and VGA , SVGA; Intel 8087 Numeric Data Processor , Word formats , Programming with 8087 numeric coprocessor .

6. Advanced Microprocessors : Overview of 80186 , 80286 , 80386 , 80486 architectures . Detailed study of Pentium MMX architecture , Pentium II . Typical Memory Management unit hardware & operations . Protected Virtual Mode . A comparative survey of the contemporary Non - Intel microprocessors with the above .
7. Bus Standards : Study of the PC , PC - AT, ISA , EISA , IEEE -488 Bus , Ide , EIDE ,SCSI , VESA , PCI , PC Card (Pc MCIA) Bus .

Practical work shall be based upon the theory course .

References :

1. Douglas V Hall , Microprocessors and Interfacing , McGraw Hill , 2nd Edition , Reprint 1995 .
2. Yu Cheng Liu and Glenn A Gibson , Microcomputer systems - The 8086/8088 Family Architecture , Programming and Design , Prentice Hall of India , Reprint 1997.
3. Govind Rajalu - IBM PC and its Clones , TMH Publication , 1994.
4. IBM PC AT Technical Reference Manual .

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ECC 606 CO : DIGITAL SIGNAL PROCESSING

DSP(Digital Signal Processing)

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme Marks	100	0	Cont. Evaluation : 00 Examination : 00

1. Introduction to Continuous-time Signals and Systems : Continuous -time signals , Continuous - time systems and their properties , Convolution representation of Linear , time invariant continuous-time systems , Convolution of continuous - time signals , Laplace transform and transfer function representation , Frequency response function , The Fourier series and Fourier transform .
2. Discrete - time Signals and Systems : Discrete - time signals : Sequences , Discrete- time systems , Linear time - invariant systems , Convolution representation of linear time - invariant discrete - time systems , Convolution of discrete - time signals , Linear difference equations with constant coefficients , Realizations , Frequency- domain representation of discrete - time signals and systems.
3. Sampling of Continuous - time Signals : Periodic sampling , Frequency - domain representation of sampling , Reconstruction of a band - limited signal , Discrete - time processing of continuous - time signals , Continuous - time processing of discrete - time signals , Changing the sampling rate using discrete - time processing .
4. The Z - Transform : The Z - transforms , properties of the Z - transform , Transfer function representation , Inverse Z - transform , Z - transform applied to difference equations , The complex convolution theorem , Stability of discrete - time systems , Frequency response of discrete - time systems .
5. The Discrete Fourier Transform : Discrete - time Fourier Transform (DTFT) , The Discrete Fourier series , The Fourier transform of periodic signals , Discrete Fourier Transform (DFT) , Properties of the Dft , System analysis via the DTFT and DFT , Circular convolution , Linear convolution using the DFT , Implementation of the DFT using convolution .
6. The Fast Fourier Transform (FFT) Algorithms : Decimation in time Fft , Introduction to radix- 2 Ffts , Some properties of radix-2 decimation in time FFT , Decimation in frequency algorithm , Computing the inverse DFT by doing a direct Dft .

7. Introduction to Digital Filters : Recursive Digital Filters - Infinite Impulse Response (IIR) Filters : Analog approximations , Impulse invariant method , Bilinear transformation method , Matched Z -Transform method , Realizations , Non- recursive Digital Filters - Finite Impulse Response (FIR) Filters : Fourier series method , Frequency - sampling method , Realization , Direct realization of Digital Filters .
8. Introduction to Digital Signal Processor Architecture and DSP chips : Design procedure for Digital Signal Processing hardware , Special purpose hardware for the FFT , Case study of Analog Devices Digital Signal Processors , Case study of Texas Instruments Digital Signal Processors .
9. Applications of Digital Signal Processing : Applications in Speech technology : the Speech signal , Representation , Model of speech production , Digital transmission and storage of speech , Speech synthesis systems , Speaker verification and identification , Speech recognition systems , Applications in Image Processing : Introduction to the theory of two dimensional signal processing , Two - dimensional signals and systems , two - dimensional difference equations , Two - dimensional Z- transform , Two - dimensional DFT , Two dimensional filter design , Image representation , enhancement , restoration , coding , compression , etc.
10. An introduction to the Theory of Multirate Signal Processing : Decimation by a factor of D , Interpolation by a factor of I , Sampling rate conversion by a rational factor I/D. Filter design and implementation for sampling rate conversion , Applications of Multirate Signal Processing .

References :

1. Edward W. Kamen , *Introduction to Signals and Systems* , Macmillan Pub . Co. ,new York .
2. Alan W. Oppenheim & Ronald W .Schafer , *Discrete - time Signal Processing* , Prentice - Hall of India Private Limited , New Delhi .
3. Roman Kuc , *Introduction to Digital Signal Processing* , McGraw - Hill International Editions , Electrical Engineering Series .
4. John G. Proakis & Dimitris G. Manolakis , *Introduction to Digital Signal Processing* , Macmillan Publishing C. , New York .
5. Lawrence R. Rabiner & Bernard Gold , *Theory and Applications of Digital Signal Processing* , Prentice - Hall of India Private Limited , New Delhi .
6. Andreas Antoniou , *Digital Filters Analysis and Design*, Tata McGraw-Hill Publishing Company Limited , New Delhi .
7. Johnny Johnson , *Introduction to Digital Signal Processing* , Prentice - Hall of India Private Limited , New Delhi .