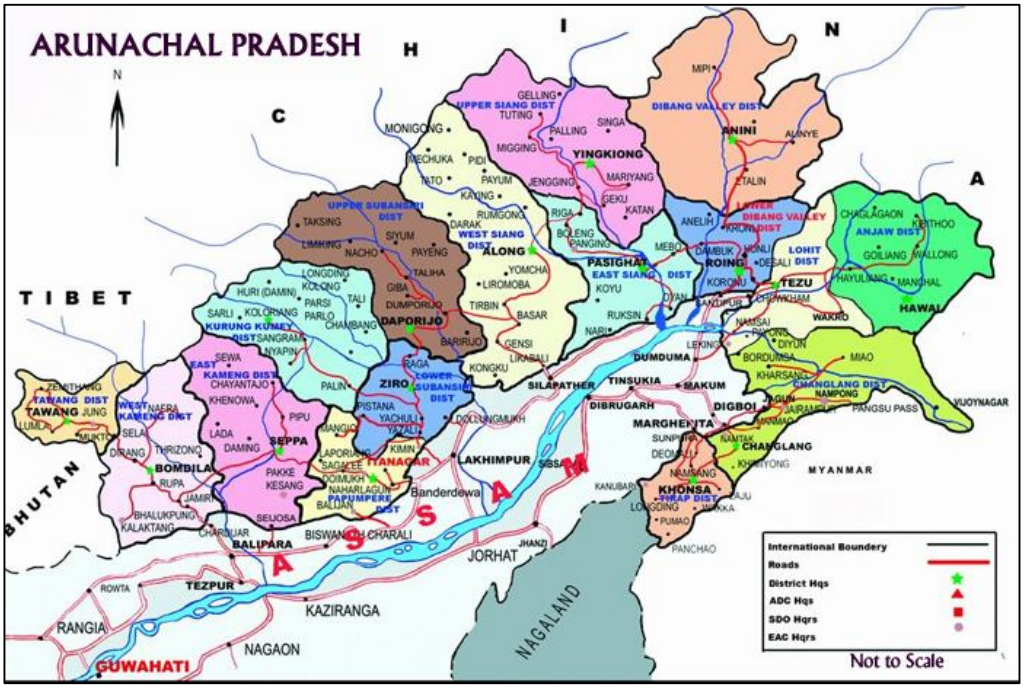
February 2013

REVISED CURRICULUM OF

COMPUTER SCIENCE & ENGINEERING DIPLOMA PROGRAMME

IN

MULTI POINT ENTRY & CREDIT SYSTEM



For the State of Arunachal Pradesh

PART-II

(Hardcore Course: Introduction to C Programming for CSE)

National Institute of Technical Teachers' Training & Research

Block – FC, Sector – III, Salt Lake City, Kolkata – 700 106

http: / / www.nitttrkol.ac.in

REVISED CURRICULUM OF PART – II

COMPUTER SCIENCE & ENGINEERING DIPLOMA PROGRAMME

IN MULTI POINT ENTRY & CREDIT SYSTEM

NATIONAL INSTITUTE OF TECHNICAL TEACHERS' TRAINING AND RESEARCH
Block – FC, Sector – III, Salt Lake City, Kolkata – 700106

February 2013

Foreword

Government of Arunachal Pradesh has entrusted NITTTR, Kolkata for revising the existing course curricula in eight subject areas and for developing the new course curricula in the two areas.

Revised Course Curricula:

1. Herbal Technology
2. Garment and Fashion Technology
3. Hotel Management and Catering Technology
4. Travel and Tourism Management
5. Electrical and Electronics Engineering
6. Civil Engineering
7. Computer Science and Engineering
8. Automobile Engineering

New Course Curricula:

1. Electronics and Communication Engineering
2. Electrical Engineering
3. Mechanical Engineering

The Institute conducted a series of workshop involving experts in different subject areas for development of the course curricula. An effort has also been made to ensure that the revised course curricula do not deviate significantly from the existing course curricula and at the same time reflect the recent trends in a particular subject area.

The Institute welcomes any meaningful suggestions which can be incorporated in the final versions of the above said document.

Sd/-
(Prof. S. K. Bhattacharyya)
Director
NITTTR, Kolkata

Contents

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(Using MPECS)
(Includes scheme of study and evaluation)

1. FOUNDATION COURSES FOR COMPUTER SCIENCE AND ENGINEERING:

Sl. No	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam	Progressive Assessment		End Exam	Progressive Assessment			
								Class Test	Assignment*		Sessional	Viva		
1	G101	Communication Skill-I		3	0	0	75	10	15	0	0	0	100	3
2	G102	Communication Skill-II	G101	2	1	2	50	0	0	25	25	0	100	4
3	G103	Mathematics-I		3	1	0	75	10	15	0	0	0	100	4
4	G104	Mathematics-II		3	1	0	75	10	15	0	0	0	100	4
5	G105	Physics –I		3	0	2	75	10	15	25	25	0	150	4
6	G106	Physics-II	G105	3	0	2	75	10	15	25	25	0	150	4
7	G107	Chemistry – I		3	0	2	75	10	15	25	25	0	150	4
8	G108	Chemistry – II	G107	3	0	2	75	10	15	25	25	0	150	4
9	G109	NCC I/NSS I		0	0	2	0	0	0	25	25	0	50	1
10	G110	NCC II/NSS II		0	0	2	0	0	0	25	25	0	50	1
TOTAL				**23**	**3**	**14**	**575**	**70**	**105**	**175**	**175**	**0**	**1100**	**33**

*** The marks for assignment (15) should include five (5) marks for attendance.**

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(Using MPECS)
(Includes scheme of study and evaluation)

2. HARD CORE COURSES FOR COMPUTER SCIENCE AND ENGINEERING:

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	G201	Engineering Drawing-I		1	0	3	50	0	0	0	50	0	100	3
2	G202	Engineering Drawing-II	G201	1	0	3	50	0	0	0	50	0	100	3
3	G203	Workshop Practice-I		1	0	3	0	0	0	50	50	0	100	3
4	G204	Workshop Practice-II	G203	1	0	3	0	0	0	50	50	0	100	3
5	G205	Engineering Mechanics		3	0	0	75	10	15	0	0	0	100	3
6	CSE206	Introduction to C-Programming *		3	1	4	75	10	15	50	50	0	200	6
7	G207	Fundamentals of Electrical & Electronics Engg.		3	0	2	75	10	15	25	25	0	150	4
TOTAL				**13**	**1**	**18**	**325**	**30**	**45**	**175**	**275**	**00**	**850**	**25**

***for CSE students only**

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(Using MPECS)
(Includes scheme of study and evaluation)

3. SOFT CORE COURSES FOR COMPUTER SCIENCE AND ENGINEERING: (Any TWO to be taken)

Sl No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	G301	Environmental Education*		3	0	0	75	10	15	0	0	0	100	3
	G302A	Engineering Economics & Accountancy		3	0	0	75	10	15	0	0	0	100	3
2	G302B	Principles of Management		3	0	0	75	10	15	0	0	0	100	3
3	G302C	Entrepreneurship Development		3	0	0	75	10	15	0	0	0	100	3
4	G302D	Organizational Behavior		3	0	0	75	10	15	0	0	0	100	3
5	G302E	Elements of Electronics		3	0	0	75	10	15	0	0	0	100	3
6	G302F	Materials Science	G105, G106, G107, G108	3	0	0	75	10	15	0	0	0	100	3
TOTA				**6**	**0**	**0**	**150**	**20**	**30**	**0**	**0**	**0**	**200**	**6**

*** Compulsory Soft core**

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(Using MPECS)
(Includes scheme of study and evaluation)

4. BASIC TECHNOLOGY COURSES FOR COMPUTER SCIENCE AND ENGINEERING:

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam	Progressive Assessment		End Exam	Progressive Assessment			
								Class Test	Assign-ment		Sessio-nal	Viva		
1	CSE401	Digital Electronics	–	3	1	2	75	10	15	25	25	0	150	5
2	CSE402	Computer Organization	–	3	1	0	75	10	15	0	0	0	100	4
3	CSE403	Data Structure	CSE206	3	1	2	75	10	15	25	25	0	150	5
4	CSE404	Communication Theory	–	3	1	0	75	10	15	0	0	0	100	4
5	CSE405	Microprocessor	CSE401	3	1	3	75	10	15	25	25	0	150	5
6	CSE406	Operating system	CSE402, CSE403	3	1	2	75	10	15	25	25	0	150	5
7	CSE407	Computer Networks	CSE404	3	1	2	75	10	15	25	25	0	150	5
8	CSE408	Computer Graphics	–	3	1	0	75	10	15	0	0	0	100	4
9	CSE409	Principles of Multimedia	–	3	1	4	75	10	15	50	50	0	200	6
TOTAL				**27**	**9**	**15**	**675**	**90**	**135**	**175**	**175**	**0**	**1250**	**43**

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH (Using MPECS)
(Includes scheme of study and evaluation)

5. APPLIED TECHNOLOGY COURSES FOR COMPUTER SCIENCE AND ENGINEERING:

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam	Progressive Assessment		End Exam	Progressive Assessment			
								Class Test	Assign-ment		Sessio-nal	Viva		
1	CSE501	DBMS	CSE403	3	1	4	75	10	15	50	50	0	200	6
2	CSE502	Object Oriented Programming	CSE206	3	1	4	75	10	15	50	50	0	200	6
3	CSE503	Web Design	–	1	1	6	50	0	0	50	50	0	150	5
4	CSE504	Software Engineering	–	3	1	0	75	10	15	0	0	0	100	4
5	CSE505	Internetworking	CSE407	3	1	4	75	10	15	50	50	0	200	6
6	CSE506	Multimedia Technology & Design	CSE409	3	1	4	75	10	15	50	50	0	200	6
7	CSE507	Technical Seminar	–	0	0	6	0	0	0	0	50	50	100	3
8	CSE508	Industrial Training	As per Ind. Trg. table	0	0	–	0	0	0	0	100	100	200	10
9	CSE509	Project	–	0	0	8	0	0	0	0	100	50	150	4
TOTAL				**16**	**6**	**36**	**425**	**50**	**75**	**250**	**500**	**200**	**1500**	**50**

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(Using MPECS)
(Includes scheme of study and evaluation)

6. ELECTIVE COURSES FOR COMPUTER SCIENCE AND ENGINEERING:
(Any TWO to be taken from Sl. No. 1-3 & any ONE from Sl. No. 4-5)

Sl. No	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam	Progressive Assessment		End Exam	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	CSE601	Computer Troubleshooting and maintenance	–	2	1	4	50	0	0	25	25	0	100	5
2	CSE602	Java Programming	–	2	1	4	50	0	0	25	25	0	100	5
3	CSE603	E-Commerce	–	2	1	4	50	0	0	25	25	0	100	5
4	CSE604	Wireless and Mobile Communication	–	3	0	0	75	10	15	0	0	0	100	3
5	CSE605	Parallel and Distributed Computing	–	3	0	0	75	10	15	0	0	0	100	3
TOTAL OF THREE COURSES				**7**	**2**	**8**	**175**	**10**	**15**	**50**	**50**		**300**	**13**

BASIC TECHNOLOGY COURSES
FOR
COMPUTER SCIENCE AND ENGINEERING

DIGITAL ELECTRONICS

L	*T*	*P*	***Curri. Ref. No.: CSE401***
3	*1*	*2*	

Total Contact hrs : 90 ***Total marks: 150*** ***Theory: 100***
Theory: 45 *End Term Exam: 75*
Tutorial:15 *P.A.: 25*
Practical: 30 ***Practical:50***
Pre requisite: NIL *End Term Exam:25*
Credit: 5 *P.A. : 25*

Theory
Total Periods : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Number System:** Number Systems and Codes : Decimal, Binary, Octal, Hexadecimal number system and conversion from one number system to another, Arithmetic operations using these number systems, Representation of negative number in the different number systems, Complements and complement subtraction, Different codes (8421, Ex~3, 2421, Gray, Alphanumeric, BCD, Seven segment codes etc) and code conversions.	6
2.0	**Boolean Algebra and Logic Gates:** Postulates and different theorems. SOP and POS forms of expression and their conversion. Simplification : using Boolean theorems and k-map (up to 4 variables) Basic logic gates - their symbols, truth table and logic ' expression for the output simple circuit realization using the logic gates. Realization of any expression either using all NAND or NOR gates	6
3.0	**Combinational Logic Circuits :** Arithmetic circuit (Adder/ Subtractor), Multiplexers and their uses, Decoder/demultiplexers and their uses, code converter, Encoder, parity generator/checkers.	8
4.0	**Families of Logic Circuit :** TTL and CMOS family, open collector and tri-state logic gates.	3
5.0	**Storage Devices & Sequential Circuits :** Latches and Flip-flops, Timing diagrams of latches and flip flops, conversion of one flipflop to another, Counters - Binary ripple counters, Asynchronous module counters, UP/Down counter, Synchronous counters (binary, different modulo and UP/Down), Timing diagram of all types of counters. Brief introduction to a few commercially available counter ICs (asynchronous and synchronous).	06+04+02 =12
5.1	Shift-registers-Different types of shift registers and their functional details,	

A few applications of shift-registers.

5.2 Memory -Memory types and terminology, Memory organization, Semiconductor memory, reading and writing, RAM, ROM, PROM cells and circuits, EPROM (Programming and erasing), Dynamic RAM, Memory expansion, PLA.

6.0 **Data Converters :** 6

Digital-to-Analog Conversion - Weighted resistor, R-2R ladder, DAC performance and their characteristics.
Analog-to-Digital Conversion - Counter type ADC, dual slope type, successive approximation type, tracking type and flash type, ADC performance and their characteristics.

7.0 **Display and Display Drives :** 4

Introduction to LED, LCD, 7-segment displays, Bar graph display and Dot matrix displays. Decoder drivers for 7-segment display, Bar graph display and LCD. Multiplexing of display.

45

Practical

Total Periods : 30
Periods : 2 P/W

1. Verification of truth tables of different basic logic gates.
2. Realisation of logic expressions using different basic logic gates.
3. Realisation of logic expressions using either all NAND or all NOR gates.
4. Adder circuits (Half, Full-adder) design.
5. Design of a multiplexer using logic gates (4 to 1 Multiplexer)
6. Use of commercially available multiplexer ICs to realise two logic functions.
7. Design of a decoder using logic gates (2 to 4 decoder)
8. Use of commercially available decoder ICs to realise two logic functions.
9. Design of RS, JK, D latches using logic gates.
10. Design of master/slave JK flip-flop.
11. To study the functional behaviour of some commercially available flip-flop ICs (JK and D)
12. Counter design (modulo 6 and 10 asynchronous and synchronous counters) using flip-flop and to display the counts on 7-segment display units.
13. To study the performance of some commercially available counter ICs (asynchronous and synchronous), cascading of counter ICs, Different modulo (MOD-6 and MOD-10) counter design using counter ICs.
14. To design a shift register using flip-flops and to study its behaviour.
15. To study the different functional features of shift register ICs.

REFERENCE BOOKS :

1. Digital Systems – by Ronald J. Tocci, PHI
2. Digital Design – by Mano, PHI
3. Digital Logic & Comp. Design – by Mano, PHI

LIST OF EQUIPMENT

1. Digital Trainer Kit
2. Powered Project board containing
   - i) Solderless breadboard with
   - ii) Power supply
   - iii) Power lead and connector plate

3. Logic Trainer lab with
   - i) DC power supply (+5V, 1A, 5V at 500 mA +/- 15V at 500 mA)
   - ii) Logic Switches (slide)
   - iii) Pulse generator 1Hz, 10Hz & 100 Hz sq. wave
   - iv) Logic gates (30 built in logic gates comprising dual input for each of AND, OR, NAND, NOR, XOR & NOT gates)
   - v) Power supply

4. Flip-flop trainer kit

5. Counter trainer kit

COMPUTER ORGANIZATION

L	*T*	*P*	***Curri. Ref. No.: CSE402***
3	*1*	*0*	

Total Contact hrs : 60
Theory: 45
Tutorial:15
Practical: 0
Pre requisite: NIL
Credit: 4

Total marks: 100

Theory: 100
End Term Exam: 75
P.A..: 25
Practical:0
End Term Exam:0
P.A. : 0

Theory
Total Periods : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Evolution of Computers :** Brief history of development; Babbage's machines, Von Neumann Concept, Difference between calculators and computers, Generations of Computer -SSI, LSI, VLSI, Classification - micro, mini, main frames and supercomputers. PC's and portable systems.	5
2.	**Number Representation :** Positional Number Systems – Decimal, Binary, Octal, Hexadecimal Signed numbers, Signed - magnitude 1's complement, 2's complement and excess notations, numbers, Fixed and floating point numbers and operations, Booth's Algorithm, Common errors in arithmetic truncation errors, round of errors. Codes : weighted and non-weighted, BCD, ASCII, EBCDIC	5
3.	**Central Processing Unit :** Components of Arithmetic Logic Unit (in block diagram only), Different types of instructions, Instruction format, addressing modes, different CPU registers - Accumulator, Flag, Program Counter, Instruction Register and General Purpose registers. Hardware control unit - its different functions	8
4.	**Microprocessor :** Intel 8085 architecture and simple assembly language programming concept, Brief introduction to Intel 8086/8088 and Pentium processor (relative study), Brief introduction to RISC processor	7
5.	**Memory :** Concept of bits, bytes and words; Storage of numbers and characters, RAM, ROM, EPROM; Concept of cache memory - its role in performance improvement, memory hierarchy	6

6.	**I / O Devices :** Printers - Dot Matrix, Ink Jet, Line, Laser; Visual display unit – alphanumeric and graphic, Keyboard, Graphics devices - mouse, joy-stick, Scanners and digitizers, Auxiliary storage devices - floppy and Hard disk : Sectors, tracks and cylinders, accessing mechanisms (brief idea) Magnetic tapes - description and accessing mechanisms, CD ROM	10
7.	**PC Architecture**	4

		45

REFERENCE BOOKS :

1. Computer System Architecture – by Mano, PHI
2. Computer Architecture and Organization – by Govindarajalu, TMH
3. Computer Architecture & Organisation – by J. P. Hayes, MGH
4. Computer Organisation & Design – by Pal Chaudhuri, PHI
5. Computer Organisation & Architecture – by Stallings, PHI
6. Computer Organisation – by V. C. Hamacher, Z. G. Vranesic & S. G. Zaki, MGH

DATA STRUCTURE

L	*T*	*P*	***Curri. Ref. No.: CSE403***
3	*1*	*2*	

Total Contact hrs : 90
Theory: 45
Tutorial: 15
Practical: 30
Pre requisite: CSE206
Credit: 5

Total marks: 150

Theory: 100
End Term Exam: 75
P.A.: 25
Practical: 50
End Term Exam: 25
P.A. : 25

Theory
Total Periods : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction and Overview**	2
	1.1 Introduction	
	1.2 Basic Terminology	
	1.3 Elementary Data Organization	
	1.4 Data Structures	
	1.5 Data Structure Operation	
	1.6 Algorithms; Complexity; Time- space Tradeoff	
2.	**Preliminaries**	3
	2.1 Introduction	
	2.2 Mathematical notation and Functions	
	2.3 Algorithmic Notation	
	2.4 Control Structures	
	2.5 Complexity of Algorithms	
	2.6 Sub algorithms	
	2.7 Variables	
	2.8 Data Types	
3.	**String Processing**	5
	1.1 Introduction	
	1.2 Basic Terminology	
	1.3 Storing Strings	
	1.4 Character Data Type	
	1.5 String Operation	
	1.6 Work Processing	
	1.7 Pattern matching Algorithms	
4.	**Arrays, Records and Pointers**	8
	1.1 Introduction	
	1.2 Linear Arrays	
	1.3 Representation of Linear Arrays in Memory	
	1.4 Traversing Linear Arrays	
	1.5 Inserting and Deleting	

1.6 Sorting; Bubble Sort
1.7 Search; Linear Search
1.8 Binary Search
1.9 Multidimensional Arrays
1.10 Pointers; Pointer Arrays
1.11 Records; Record Structures
1.12 Representation of Records in Memory; parallel Arrays
1.13 Matrices
1.14 Spares Matrices

5. **Linked Lists** 5
5.1 Introduction
5.2 Linked Lists
5.3 Representation of Linked Lists in Memory
5.4 Traversing a Linked List
5.5 Searching a Linked List
5.6 Memory Allocation Garbage Collection
5.7 Insertion into a linked list
5.8 Deletion from a Linked List
5.9 Header Linked Lists
5.10 Two –Ways Lists

6. **Stacks, Queues, Recursion** 6
6.1 Introduction
6.2 Stacks
6.3 Array Representation of Stacks
6.4 Arithmetic Expression; Polish Notation
6.5 Quicksort, an Application Stacks
6.6 Recursion
6.7 Towers of Hanoi
6.8 Implementation of Recursive Procedures by Stacks,
6.9 Queues
6.10 Defuse
6.11 Priority Queues

7. **Trees** 5 7.1
Introduction
7.2 Binary Trees
7.3 Representing Binary Trees in Memory
7.4 Traversing Binary Trees
7.5 Traversal Algorithms using Stacks
7.6 Header Nodes; Threads
7.7 Binary Search Trees,
7.8 Trees, Searching and Inserting in a Binary Search Tree
7.9 Deleting in a Binary Search Tree
7.10 Heap, Heapsort
7.11 Path Lengths; Huffman's Algorithm
7.12 General Trees

8. **Graphs and Their Application** 4
8.1 Introduction

8.2 Graph Th. Terminology
8.3 Sequential Representation of Graphs; Adjacency matrix, path matrix
8.4 Warshall's Algorithm, Shortest Paths
8.5 Linked Representation of a Graph
8.6 Operations on Graphs
8.7 Traversing a Graph

9. **Sorting and Searching** 5
9.1 Introduction
9.2 Sorting
9.3 Inserting Sort
9.4 Selection Sort
9.5 Merging
9.6 Merge-sort
9.7 Radix Sort
9.8 Linear searching
9.9 Binary searching
9.10 Interpolation searching
9.11 Hashing

10. **Introduction to File Organization** 2
Sequential, Index-Sequential and Direct file Organization

45

Practical
Total Periods : 30
Classes : 2 P/W

Program Related to

1. Creation of singly & doubly linked list
2. Insertion, deletion and updation of (1) above
3. Creation of stack, queue and insertion/deletion operation on Stack/Queue
4. Conversion amongst infix, prefix & postfix expressions
5. Creation of tree and insertion/deletion of a node
6. Tree traversal problem
7. Graph search algorithms
8. Searching & Sorting Algorithm

REFERENCE BOOKS:

1. Data Structures - by Seymolur Lipschutz (Schaum Series)
2. Fundamentals of Computer Algorithms - by Horowitz,E & Sahani, S - Galgotia
3. Data Structures Theory Applications - by Trembly & Sorenson, TMH

LIST OF EQUIPMENT

Hardware : Stand alone PC
(for detail, please refer Annex – I)
Software : C Compiler

COMMUNICATION THEORY

L	*T*	*P*	***Curri. Ref. No.: CSE404***
3	*1*	*0*	

Total Contact hrs : 60 ***Total marks: 100*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*

Tutorial: 15 *P.A.: 25*

Practical: 0 ***Practical: 0***

Pre requisite: NIL *End Term Exam:0*

Credit: 4 *P.A. : 0*

Theory

Total Periods : 45

Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Analog Communication :** Amplitude Modulation : Need to modulate definition, Carrier, Sidebands, Modulation factor and percentage Modulation, Power in carrier and sidebands, Modulated wave form, generation of Double side band (DSB) and single side and (SSB) Brief Description with block diagram of an AM transmitter.	5
2.	**AM Radio Receiver :** Demodulator : Square law deleetor, Concept of hetero dyning, Block Schematic diagram and operational description of an AM receiver, sensitivity, selectivity and Fidelity of a receiver. Qualitative idea about IF freq, Local OSC, IF stage and output audio stages	4
3.	**Frequency Modulation principles :** Definition, Modulated wave, Frequency Deviation % Modulation, Bandwidth, & Spectrum of FM wave. Armstrong method of Generation of FM wave. Brief description about FM transmitter	4
4.	**FM Receivers :** Detection of FM wave, the Discriminator, Qualitative Description of different stages of an FM receiver. Comparison of AM and FM systems	3
5.	**Telegraphy :** Nodes – Morse, cable, 5 unit & 7 unit code and their uses, speed of working band, Manual Telegraphic System, Principles of Carrier Telegraphy Telegraph Instruments : Mouse key (single current), double current key, PBO secounder polarised and non-polarised telegraph relays Teleprinter : Principles of working, Construction of Teleprinter, transmitter receiver, automatic Telex system (Principle of working) Line Testing : Murray & Verley looptests, Principles of carrier telegraphy	5

6.	**Telephone :** Telephone Instruments : Subscriber Telephone apparatus and accessories, Receiver, Transmitter, magnetic generator, Hay's transmission bridge, working principles of manual exchange High grade Communication Receivers (Modular block diagram & working principles Study of frequency synthesiser, phase locked loop, VCD digital read out, different types of filters and detectors Noises in receivers and their reduction Principles of VHF receivers, Digital discriminator, selective calling circuit. Automatic Telephones : Principles of multi exchange, Intercensing, Telex & RTTTU	5
7.	**Digital Modulation Techniques :** Principle of Sampling, Quantization, pulse code modulation (PCM). Frequency shift Keying (FSK) and phase shift keyin (SK)	4
8.	**Digital Communication :** Data forms, VRF System : (Simplex, half duplex, duplex communication) Transmission Mode between statious, Networks : Point to point, star, Ring, Bus. Data Communication systems Block schomatic Description Brief Introduction to Time Division Multiplexing, freguency Division Multiplexing principle under hygin synchronom and Asynchronoum transmission. Moderns Low speed modems, Medium speed modems and High speed Modems concept and need for protocols.	10
9.	A brief Introduction to Fiber optic communication system and satellite communication system. An introductory description of Mobile communication.	3
10.	Antenna – Basic principles	2

		45

REFERENCE BOOKS:

1. Data Communication and Networking – by B.A. Forouzan TMH
2. Principles of Communication Systems – by H. Taub, D.L. Schilling, G. Saha, TMH
3. Digital and Analog Communication System – by L.W. Couch, Pearson Education
4. Radio Antenna and Propagation – by W. Gosling, Newsnes

MICROPROCESSOR

L	*T*	*P*	***Curri. Ref. No.: CSE405***
3	*1*	*3*	

Total Contact hrs : 105 ***Total marks: 150*** ***Theory: 100***

Theory: 45
Tutorial: 15
Practical: 45
Pre requisite: CSE401
Credit: 5

End Term Exam: 75
P.A.: 25
Practical: 50
End Term Exam: 25
P.A : 25

Theory
Total Periods : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	Introduction to Microprocessor - Evolution of Microprocessors, Specific features of Microprocessors, Application in our daily life (a few examples)	2
2.	Internal architecture of a microprocessor (using block diagram); Explanation of each block in brief, Concept of bus structure, Register-to-register transfer, Communication with I/O and memory (This part can be explained using the specific microprocessors like 8085 or 8086/8088). Pin details of 8085 and 8086/8088 CPU and their functions in brief.	6
3.	Addressing modes in general (may be limited to 8085 and 8086/8088 CPU),Instruction cycles, Instruction set, timing diagram (may be limited to 8085 and 8086/8088 CPU). Concept of assemblers and compilers	3
4.	Interfacing of Memory and I/O devices : Concept of address space, address/data bus demultiplexing, address and data bus buffering, address decoding, I/O concepts, memory interfacing concept of I/O mapped I/O and memory mapped I/O. Interrupts - Types of interrupts, Hardware and software data transfer schemes - Synchronous, asynchronous and interrupt driven.	5
5.	Assembly Language Programming : (This part may be limited to the use assembly language of 8085 or 8086/8088 CPU) i) Example for register to register, register to memory, memory to register, block of data movement from one area of memory	10

to another, merging of two blocks of data, data block exchange.

ii) Examples of arithmetic addition, subtraction, multiplication and division

iii) Examples of searching and sorting (simple)

iv) Examples using of look up tables

v) Use subroutines and delay programme.

6. Peripheral chips and their Interfacing : 6

Functional description of 8255, 8253, 8251, 8257, 8237 and 8259. Interfacing of these chips with some standard CPU. Simple assembly language programme to explain the function of these chips.

7. Special Purpose Interfacing Devices and their Interfacing : 4

Keyboard interfacing, 7 segment and dot matrix display interfacing, A/D and D/A interfacing, Stepper motor interfacing

8. Recent standard µp : Intel family, HP family and motorola family. Concepts of embedded µp. 4

9. PC Interfacing : Simple interfacing of Input/Output peripherals like LED, 7 segment LED display modules, steppes motor, relays through digital I/O card or through the parallel port. Serial link between microprossor trainer kit and PC serial port, EPROM programming using PC port. 5

45

Practical

Total Periods : 45
Periods : 3 P/W

I. EXPERIMENTS WITH MICROPROCESSOR

1. Acquaintance with the microprocessor trainer kit hardware and the user's commands (Dynalog/Vinyties/ALS)

2. Assembly language programme development :
Data transfer programme - Register to Register,
Register to Memory and Vice-Versa

Arithmetic Operation - 8 bit addition and subtraction, multibyte addition and subtraction, BCD addition and subtraction, multiplication using repeated addition, multiplication using shift-add process, signed multiplication, Binary division, BCD division

3. Array processing - Adding one entry to an array, checking of an ordered list, replacing of one or more entires in a list, sorting and searching, block movement, block exchange and data insertion

4. Look-up table - finding squares, cubes etc., of a number using look-up table, code conversion using look-up table

5. Delay program, use of subroutine (use the above programme as a subroutine in a main programme)

6. Data Input/Output - Programming 8255 with the basic I/O modes, programming 8253, interfacing 7-segment display, bar graph display, multiplexed display, programming 8253, in different modes, waveshape generation using 8253, Interfacing of ADC and DAC with microprocessors/microcontroller, keyboard interfacing (using interrupts or polling) to microprocessor/microcontroller, relay interfacing, stepper motor interfacing.

7. PC Interfacing : Experiments on ADC/DAC interfacing, to stepper motor interfacing and display interfacing, Other interfacing problems may be repeated using PC interfacing and run by using any High level language.

REFERENCE BOOKS:

1. Introduction to Microprocessor - by A.P. Mathur, TMH
2. Microprocessor - by Ramesh S. Gaonkar, PHI
3. Microprocessor - by D.Hall, MGH
4. IBM PC & Clones - by Govindarajalu, TMH
5. Computer Organization & Architecture - by William Stalings, PHI

LIST OF EQUIPMENT

1. PC (for detail, please refer Annex – I)
2. UPS
3. Printer
4. Digital real-time oscilloscope
5. Function Generator
6. Digital Multimeter
7. CBT/CAI Interface Base Unit
8. Light Sensor Module
9. Temperature Sensor Module
10. Pressure Transducer Module
11. Sensor Module – Semiconductor Temperature, Light Sensor, Pressure Sensor & Magnetic Sensor
12. Stepper Motor Control Module
13. Intel MCS-51 Microcontroller System
14. EPROM Programmer
15. 32-Bit Microprocessor, 8085 Microprocessor kit (trainer)
16. LED Display
17. Peripheral chips, 8255, 8253, 8251, 8237, 8259
19. Microassembler

OPERATING SYSTEM

L	*T*	*P*	***Curri. Ref. No.: CSE406***
3	*1*	*2*	

Total Contact hrs : 90
Theory: 45
Tutorial: 15
Practical: 30
Pre requisite:
CSE402, CSE403
Credit: 5

Total marks: 150

Theory: 100
End Term Exam: 75
P.A.: 25
Practical: 50
End Term Exam: 25
P.A : 25

Theory
Total Period : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction**	2
	1.1 Definition of O.S	
	1.2 History of O.S	
	1.3 Concepts	
	1.4 Structure	
2.	**Processes**	4
	2.1 Definition of process & thread	
	2.2 Interprocess communication	
	2.3 Classical I.P.C. problems	
	2.4 Process Scheduling	
3.	**Process Scheduling Algorithm**	5
	3.1 Resident Monitor(Single user)	
	3.2 Multi user system	
	3.3 Time sharing system	
	3.4 FIFS	
	3.5 Round Robin Fashion/Time quantum. Concept.	
	3.6 Multiple queues	
	3.7 Priority queues	
	3.8 Shortest job first	
4.	**Memory Management**	7
	4.1 Resident Monitor	
	4.2 Multiple Partition	
	4.3 Garbage collection and compaction	
	4.4 Paged memory management	
	4.5 Page Replacement Algorithms	
	4.6 Swapping	
	4.7 Segmentation	
	4.8 Segmented paged memory management	

4.9 Demand paged memory management
4.10 Virtual Memory

5. **File Systems** 5
   - 5.1 Concept of Files & Directories
   - 5.2 File System Implementation
   - 5.3 Security Issues in Files
   - 5.4 Protection Mechanisms
   - 5.5 Case studies of Unix file system

6. **Input/Output** 4
   - 6.1 Principles of I/O Hardware
   - 6.2 Principles of I/O Software
   - 6.3 Disk
   - 6.4 Clocks
   - 6.5 Serial and Parallel port access
   - 6.6 Terminal Access

7. **Device Management** 3
   - 7.1 Techniques for Device Management – Dedicated, shared, virtual
   - 7.2 Device allocation considerations I/O traffic control & I/O Schedule, I/O Device handlers
   - 7.3 SPOOLing

8. **Dead Locks** 5
   - 8.1 Concept of deadlock
   - 8.2 Resources
   - 8.3 Dead lock Prevention : Blanker Algorithm & Safety Algorithm
   - 8.4 The Ostrich Algorithm
   - 8.5 Deadlock Detection and Recovery
   - 8.6 Deadlock Prevention

9. **Distributed O.S.** 5
   - 9.1 Introductory concepts
   - 9.2 Types of Distributed O.S
   - 9.3 Workstation server model
   - 9.4 The processor pool model
   - 9.5 The hybrid model
   - 9.6 Case study SUN NFS File Server

10. **Case Studies** 5
   - 10.1 UNIX & LINUX O.S
   - 10.2 MS-DOS & WINDOWS XP / Vista / 7
   - 10.3 WINDOWS – 2003, 2008

45

Practical
Total Period : 30
Periods : 2 P/W

UNIX

1. Overview of UNIX
   UNIX as an Operating system, Kernel, Shell and User, UNIX File System, Files and Directories, Access permission, File system hierarchy

2. Basic UNIX Commands
   Listing of files and directories, Copying, Deletion, Renaming and Comparing files, Creation, Navigation and Removing directories, Access permission of files and directories, Editors in UNIX, Status of users, terminals, date and time, Displaying blown-up message, Paging and printing of files, Background jobs

3. Advance Features of UNIX
   I-nodes, Trees, Pipes and Filters, Cutting, Pasting and Sorting of files, Searching for a pattern in a string

4. Programming with the Shell
   System variables and shell variables, Interactive shell scripts, shell termination, Conditional statements, Looping statements, Special parameters in shell Computation and string handling

REFERENCE BOOKS :

1. Operating System – Madnick and Donovan - MGH
2. Operating System Concepts – A. Silberschatz and P. Galvin - ADP
3. The UNIX Programming Environment – by Kernighan & Pike - PHI
4. UNIX – Concepts & Application – by Sumitabha Das - TMH

LIST OF EQUIPMENT

Hardware : Unix Server with Clients
(for detail, please refer Annex – I)

Software : Unix Operating System

COMPUTER NETWORKS

L	*T*	*P*	***Curri. Ref. No.: CSE407***
3	*1*	*2*	

Total Contact hrs : 90 ***Total marks: 150*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*
Tutorial: 15 *P.A.: 25*
Practical: 30 ***Practical: 50***
Pre requisite: CSE404 *End Term Exam: 25*
Credit: 5 *P.A : 25*

Theory
Total Period : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction**	6
	1.1 The uses of Computer Network	
	1.1.1 Network Goals	
	1.1.2 Application of Network	
	1.2 Network Structures	
	1.3 Network Architecture	
	1.3.1 Protocol Hierarchies	
	1.3.2 Design Issues for the Layers	
	1.4 The O.S.I Reference Model	
	1.5 Services	
	1.5.1 OSI Terminology	
	1.5.2 Connection-oriented and Connectionless services	
	1.5.3 Service primitives	
	1.5.4 The Relationship of services to protocols	
	1.6 Example Network	
	1.6.1 Public Networks	
	1.6.2 ARPANET	
	1.6.3 Novell Netware	
2.	**The Physical Layer**	6
	2.1 Transmission Median	
	2.2 Wireless Transmission	
	2.3 Telephone System	
	2.4 ISDN	
	2.5 Transmission and switching	
	2.6 LAN Topology & LAM Media	
3.	**The Medium Access Sub layer**	5
	3.1 ALOHA	
	3.2 CSMA	
	3.3 Collision Free protocols	
	3.4 IEEE Standard 802 for LAN	
	Ethernet, Token Bus, Token ring	

3.5 Network Devices: Repeaters, Hubs, Switches, Routers, Gateways

4. The Data Link Layer 4

4.1 Data Link Layer Design Issue
4.2 Error Detection and Correction
4.3 Elementary Data Link Protocols
4.4 Sliding windows protocols

5. The Network Layer 4

5.1 Network Layer Design Issues
5.2 Routing Algorithms
5.3 Congestion Control Algorithms

6. The Transport Layer 4

6.1 The Transport Services
6.2 Elements of Transport Protocols
6.3 A simple Transport Protocols

7. The session Layer 4

7.1 Design Issues
7.1.1 Concept of Data exchange
dialog management, activity management
7.2 Remote Procedure Call
7.2.1 Client-server model
7.2.2 Semantics of R.P.C

8. The Presentation Layer 4

8.1 Design Issue
8.2 Data Compression Techniques
8.3 Elementary idea of cryptography

9. The Application Layer 3

9.1 Design Issue
9.2 File Services
9.3 E Mail

10. **Concepts of Internet and www , Html, TCP/IP** 5

45

Practical

Total Periods : 30
Periods : 2 P/W

1. Study and describe the differences between centralised distributed and collaborative computing. (Students may be told to identify from given specification of system).
2. Case studies of LAN, MAN, WAN
3. Study and describe client, server, peers
(identify from given specification)
4. Study network services - remote login, telnet, ftp
(Either from internet or a network being made available)

5. Determine how a specific network service is affected given a network architecture (centralised and distributed).
6. Demonstrate different transmission media
   Twisted pair, Co-axial cables, Wireless, Identify advantages and disadvantages
7. Identify, describe - Network connectivity devices like Media connector, Interface boards, Modems, Repeaters, Hubs, Switch, Bridges, Multiplexer, Routers
8. Study main protocols through Windows 95/98/NT (any two in details)
   (TCP/IP, SLIP, PPP, FDDI, X.25, ISDN, ATM)
9. Laboratory setting-up of ethernet, installation of ethernet card and testing
10. Design LAN
11. Configure Network Server
    Windows NT, Server installation, network printing, network application, client server
12. Configure Network Clients
13. Preventing Problems in a Network
    Physical, electrical, virus, warm security
14. Troubleshooting
    Isolating a problem, recovery from disaster, study of Tools, terminators, cable protocol analysers
15. Network Administration

REFERENCE BOOKS :

1. Computer Network – by A. S. Tanenbaum, PHI
2. Data Communication & Computer Networks – by W. Stallings, PHI
3. Data Communication and Networking – by B.A. Forouzan TMH

LIST OF EQUPMENT

Hardware :
- i) Stand alone PC (for detail, please refer Annex – I)
- ii) Unix-based Server (for detail, please refer Annex – I)
- iii) NT-based Server (for detail, please refer Annex – I)
- iv) Hub (8 port/16 port)
- v) Switch
- vi) Bridge
- vii) Multiplexer
- viii) Modems
- ix) Router
- x) Network Interfacing Cards
- xi) Wire Cutter and Stripper
- xii) UTP Cables fitted with RJ-45 connectors
- xiii) STP Cables
- xiv) Coaxial Cables
- xv) Terminators
- xvi) Interface Boards
- xvii) Printers (Dot Matrix/Laser/Deskjet)

Software :
- i) Unix Operating System
- ii) NT Operating System
- iii) Windows 95/98/2000
- iv) Network Interfacing Card Drivers
- v) Anti-virus Software
- vi) Firewall Software

COMPUTER GRAPHICS

L	*T*	*P*	***Curri. Ref. No.: CSE408***
3	*1*	*0*	

Total Contact hrs : 60 ***Total marks: 100*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*
Tutorial: 15 *I.A.: 25*
Practical: 0 ***Practical: 0***
Pre requisite: NIL *End Term Exam: 0*
Credit: 4 *P.A : 0*

Theory
Total Periods : 45
Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction to Computer Graphics**	5
	1.1 Introduction	
	1.2 Image Processing ans Picture analysis	
	1.3 Conceptual frame work for interactive graphics	
	1.4 Classification	
2.	**Hardware**	4
	2.1 Various display devices	
	2.2 Video controller	
	2.3 Random - scan display processor	
	2.4 Image scanners	
	2.5 Interaction hardware	
3.	**Raster Graphics Techniques**	8
	3.1 Interaction handling	
	3.2 Raster graphics features	
	3.3 Line drawing algorithms	
	3.4 Circule drawing algorithms	
	3.5 Scan conversion	
	3.6 Polygon filling	
	3.7 Pattern filling	
	3.8 Halftoning	
	3.9 Clipping techniques	
4.	**Geometric Transformation and Viewing** :	3
	4.1 2D and 3D transformation	
	4.2 Representation and composition	
	4.3 3D viewing	
5.	**User Interfacing**	5
	5.1 Interaction handling models	
	5.2 Window management	
	5.3 Input/Output handling	
	5.4 Tool kits	

6.	**Curves & Surfaces and Solid Modeling**		7
	6.1	Polygon merhes	
	6.2	Parametric cubic curves	
	6.3	Quadric surfaces, Bezier and B-spline curves	
	6.4	Representing solids : sweep representation, boundary representation	
	6.5	Spatial partitioning	
7.	**Visibility**		5
	7.1	Hidden line and Hidden surfaces	
	7.2	Floating horizon algorithm	
	7.3	Roberts algorithm, Z-buffer	
	7.4	List priority alogrithms	
8.	**Rendering**		4
	8.1	Illumination models	
	8.2	Shadows	
	8.3	Shading	
	8.4	Transparency	
9.	**Animation**		4
	9.1	Convertion & Computer Aided animation	
	9.2	Rules & Technology	

			45

REFERENCE BOOKS :

1. Computer Graphics – by Hearn & Baker – PHI
2. Fundamentals of Computer Graphics & Multimedia – by Mukherjee – PHI
3. Multimedia – An Introduction – by John Villamil & Louis Molina – Prentice Hall
4. Multimedia – Production Planning & Delivery – by John Villamil & Louis Molina – Prentice Hall
5. Multimedia – Sound & Video – by Jose Lozano – Prentice Hall
6. Multimedia Graphics – by John Villamil & Leony Fernandez, Elias – Prentice Hall
7. Manuals for Sound Forge, Adobe Premiere, Adobe Photoshop, Authorware Attain, Director, Toolbook Instructor

PRINCIPLES OF MULTIMEDIA

L	*T*	*P*	***Curri. Ref. No.: CSE409***
3	*1*	*4*	

Total Contact hrs : 120
Theory: 45
Tutorial: 15
Practical: 60
Pre requisite: -NIL
Credit: 6

Total marks: 200

Theory: 100
End Term Exam: 75
P.A.: 25
Practical: 100
End Term Exam: 50
P.A : 50

Theory
Total Periods : 45
Periods : 3 P/W

Sl. No.	***Topic***	***Period***
1.	**Multimedia : Basic Overview** 1.1 Characteristics of Multimedia: multiple media, non-linearity, interactive, compatibility. 1.2 Hardware and software requirement (including audio and video systems) 1.3 Multimedia Application: entertainment, education & training, business, tourism and hospitality, medicine, design and engineering application. 1.4 Creation of multimedia document	**4**
2.	**Digital Media Representation** 2.1 Analog Representation 2.2 Digital Representation 2.3 Analog to Digital conversion and vice-versa 2.4 Sampling, sampling rate, Quantization and Quantization Error 2.5 Limitation of digital representation	**6**
3.	**Overview of Multimedia Building Blocks** (text, image, graphics, audio, video, animation)	**2**
4.	**Text** 4.1 Text types 4.2 Unicode standard 4.3 Fonts 4.4 Text compressions: Hoffman coding, LZ coding, LZW coding	**4**
5.	**Image** 5.1 Image types: colour, gray-scale, bi-tonal 5.2 Colour Models: RGB, CMYK, HSL or HSV 5.3 Image input devices: scanner, digital camera 5.4 Digital image specification: size, resolution, aspect ratio, bit depth 5.5 File format: bitmap, .jpg, .png, .gif, .tiff 5.6 JPG encoder and decoder	**6**

6. Graphics **8**

6.1 Cartesian Coordinate System
6.2 Line drawing algorithm
6.3 Circle drawing algorithm
6.4 Filling algorithm
6.5 Clipping algorithm
6.6 Transformation: translation, rotation and scaling
6.7 Curve and spline

7. Audio **6**

7.1 Audio characteristics: amplitude, frequency, waveform, speed, pitch, loudness & rhythm
7.2 Digital audio: sampling, sampling rate, & quantization
7.3 Audio compression: lossy and lossless format
7.4 Audio file format: compact disk digital audio, .wav, .wma, .mp3, mp4, .mid (MIDI), 3gp.
7.5 Digital Audio players

8. Video **9**

8.1 Components of video signal: Luminance and chrominance, generating YC signal from RGB
8.2 Video signal formats: component and composite video
8.3 Broadcasting Standard: NTSC, PAL, SECAM
8.4 Video Recording Standard: U-matic, betamax, betacam,VHS, Hi8, Digital8, MiniDV, DVCAM, VCD, DVD-video
8.5 File Format and codec: AVI, MOV, MPEG, DivX, 3GP, mp-4
8.6 Video Editing : online and offline editing, video editing software.

45

Practical

Total Periods : 60
Periods : 4 P/W

1. **Sound Forge**

Sound recording and editing through sound forge XP

1.1 The main screen
1.2 The data window
1.3 Opening an existing file - playing a sound file
1.4 Playing a section of a file
1.5 Copying data to a new file
1.6 Saving a file
1.7 Simple editing
1.8 Advanced editing
1.9 Editing sound formats
1.10 Applying sound processing functions
1.11 Recording sound using sound forge.

2. **Adobe Premiere**

2.1 Creating desktop video with Adobe Premiere
2.2 Creating on Adobe Premiere movie

2.3 Starting a new project importing clips, assembling the cliping construction window, previewing the movie, changing duration of a cell, creating a transition, adding other clips and transitions.
2.4 Applying filters to a clip
2.5 Changing the time unit in the construction window
2.6 Using preview command to preview the transition and filter effects
2.7 Adding sound to movie
2.8 Connecting and capturing source video through broadway cord
2.9 Editing and compressing the video

3. **Adobe Photoshop**
3.1 Scanning image
3.2 Creating new images
3.3 Changing foreground and background colours
3.4 Creating and using paths
3.5 Editing and retouching
3.6 Duplicating images
3.7 Layers - linking with layers
3.8 Grouping a images
3.9 Rubber stamp and pattern stamp tool
3.10 Painting - paintbrush tool, air-brush tool, pencil tool, eraser tool, gradient tools
3.11 Photoshop filters

4. **Adobe Authorware**
4.1 Introduction - system requirements, installing, general features
4.2 Knowledge objects - introduction to knowledge objects, choosing a knowledge object, adding a knowledge object file, authorware knowledge objects
4.3 Authoring basics - icon based authoring what each icon does the toolbar, working with icons on the flow line, authoring - step by step, distribution requirements, packaging an AW piece, packaging an AW piece for the web
4.4 Creating interactions - components of an interaction, How an interaction works, tracing the flow through an interaction, setting up an interaction step by step
4.5 Directing the flow - Decision structure, frameworks, navigation structures -step by step
4.6 Transitions, Positioning and motion - using transition for special effects, positioning objects using the motion icon, making objects move step by step.

5. **Director**

5.1 Introduction - system requirement, installing director
5.2 Basic - Overview, work area, adding interactivity with lingo, using the score, using markers, selecting and editing frames in the scores using xtras
5.3 Sprites - creating, selecting and layering sprites positioning, splitting and joining sprites
5.3 Working with cast members and casts - using the cast window, creating cast members
5.4 Behaviours - attaching behaviour, creating and modifying behaviour
5.5 Colour, Tempo and transitions - animation, navigation and user interaction, movies in a window, sound, video and synchronization, distributing movies.

6. **Toolbook Instructor**

6.1 Introduction - system requirement, installing instructor

6.2 Understanding Instructor concepts - planning the project, building an application, using open script

6.3 Exploring the Instructor interface - about the Instructor, Visual interface using tools in Instructor

6.4 Using the book specialist - working with books and pages, working with Toolbook II catalogues, working with objects, setting object properties, adding buttons, working with text & hotwords, working with list boxes and combo boxes, adding graphics, using multimedia, hiding, showing and animating objects, creating a quiz using question objects.

REFERENCE BOOKS :

1. Multimedia Communication – by Keno et al – PH
2. Fundamentals of Computer Graphics & Multimedia – by Mukherjee – PHI
3. Multimedia – An Introduction – by John Villamil & Louis Molina – Prentice Hall
4. Multimedia – Production Planning & Delivery – by John Villamil & Louis Molina – Prentice Hall
5. Multimedia – Sound & Video – by Jose Lozano – Prentice Hall
6. Multimedia Graphics – by John Villamil & Leony Fernandez, Elias – Prentice Hall
7. Manuals for Sound Forge, Adobe Premiere, Adobe Photoshop, Authorware Attain, Director, Toolbook Instructor

Books:

1. Principles of Multimedia – Ranjan Parekh – Mc-Graw-Hill –2008
2. Multimedia Communications – Fred Halsell–Pearson Education Ltd – 2009
3. Multimedia Communication System: Techniques, Standards and Networks – by K.R. Rao, Z.S. Bojkovic, A. Milovanovic, Prentice Hall

LIST OF EQUIPMENT

Hardware :	Multimedia PC (for detail, please refer Annex – I)
Software : (Latest Version)	Adobe CS 5 Master Collection Director, Toolbook

APPLIED TECHNOLOGY COURSES
FOR
COMPUTER SCIENCE AND ENGINEERING

DBMS

L	*T*	*P*	***Curri. Ref. No.: CSE501***
3	*1*	*4*	

Total Contact hrs : 120 ***Total marks: 200*** ***Theory: 100***

Theory: 45
Tutorial: 15
Practical: 60
Pre requisite: CSE403
Credit: 6

End Term Exam: 75
P.A.: 25
Practical: 100
End Term Exam: 50
P.A : 50

Theory
Total Period : 45
Period : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction to Database Management System** 1.1 Database System environment 1.2 File oriented Approach 1.3 Database Approach 1.4 Users of DBMS 1.5 Intended use of DBMS 1.6 Benefit of using database approach 1.7 Concepts of Client Server Architecture and distributed system	5
2.	**Database System Concept and Application** 2.1 Date Models, Schemes and instances 2.2 DBMS architecture and Independence 2.3 Database Languages and Interfaces 2.4 The database system environment 2.5 Classification of DBMS	5
3.	**E-R diagram** 3.1 Defining relations, Entity Set 3.2 E-R Model concept with examples	2
4.	**SQL** 4.1 Data definition in SQL 4.2 Queries in SQL 4.3 Create, Update, Insert statements in SQL 4.4 Views in SQL 4.5 Specifying additional constraints as assertions 4.6 Specifying indexes	12
5.	**Functional Dependencies and Normalization for Relational Database** 5.1 Functional dependencies 5.2 Normal forms based on primary keys	4

5.3 General definitions of second and third normal forms
5.4 Boye Codd normal form

6. **Transaction Processing Concepts** 3
   6.1 Introduction to transaction processing
   6.2 Transaction and System concept
   6.3 Desirable properties of transactions
   6.4 Schedules and recover ability

7. **Concurrency Control Techniques** 3
   7.1 Basic Concepts; Concepts of Locks : live lock, dead lock; Serializability

8. **Security and Integrity** 5
   8.1 Security and integrity violationb
   8.2 Authorization
   8.3 Authorization and Views
   8.4 Granting of Privileges
   8.5 Security specification in SQL
   8.6 Encryption

9. **Distributed Databases**
   Principles of distributed database; data fragmentations, transparency, integrity, allocation of fragments, translation of global query to fragment query; concurrency control – elementary ideas 6

45

Practical

Total Periods : 60
Classes : 4 P/W

1. Oracle
   1.1 Introduction to Oracle
   1.2 Datatypes and attributes constraints, primary key, unique, foreign key, check, not null

2. Introduction to Structured Query Language (SQL)
   2.1 Data definition language (DDL) - Create, alter, drop table
   2.2 Data manipulation language (DML) - Select, insert, update, delete
   2.3 Data control language - Grant, revoke
   2.4 Creating and deleting views, index

3. Introduction to PL/SQL
   3.1 Block structure, variable and types, looping constructs, expression and operators, functions
   3.2 Cursors variable, cursor fetch, loops
   3.3 procedure, functions, triggers
   3.4 Error handling and exceptions
   3.5 Composite datatypes

4. JDeveloper /IDS

4.1 Oracle forms - Form modules, blocks, items, windows, canvas views, triggers, master detail forms, menu, alert, LOV

4.2 Oracle reports – report generation with parameters

5 Visual Basic

5.1 Windows programming. Creation of forms, menus, etc

5.2 Basic Programming Constructs of Visual Basic-Array handling
Common controls of Visual Basic-Creation of Label control, command button, textbox, checkbox, option button, frame, list box, combo box, scroll bars, timer, shape, line.

5.3 File System Control - Dirlist box, dDrivelist box, filelist box, and synchronization of above controls Common Dialog Controls, Connectivity with Databases (with RDBMS like Oracle), Ideas on implementing ODBC Object Orientation in Visual Basic, Creation of Active X Control using Visual Basic

6. DBA function :

5.1 Installation of Oracle & J Developer

5.2 Creation of a database

5.3 Routine maintenance of database

5.4 Backup & Recovery of database

5.5 Concept of inet.ora

REFERENCE BOOKS :

1. Fundamentals of Database System - by Elmasri and Navathe - Addison-Wesley
2. An Introduction to Database Systems – by C.J. Date – Addison-Wesley
3. Principles of Database Systems – by John E. Hopcroft & Jeffrey D. Ullman – Galgotia Pub.
4. Developing personal oracle7 applications – by David Lockman – Sams Pub.
5. Oracle8 DBA handbook – by Kevin Loney – TMH

LIST OF EQUIPMENT

Hardware : Unix/NT based Client-Server environment
(for detail, please refer Annex – I)

Software : Oracle & JDeveloper/IDS
(Latest Version)

OBJECT ORIENTED PROGRAMMING

L	*T*	*P*	***Curri. Ref. No.: CSE502***
3	*1*	*4*	

Total Contact hrs : 120 ***Total marks: 200*** ***Theory: 100***

Theory: 45
Tutorial: 15
Practical: 60
Pre requisite: CSE206
Credit: 6

End Term Exam: 75
P.A.: 25
Practical: 100
End Term Exam: 50
P.A : 50

Theory
Total Period : 45
Period : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Object oriented programming concepts** 1.1 Objects 1.2 Classes 1.3 Methods and messages 1.4 Abstraction and inheritance 1.5 Abstract classes 1.6 Polymorphism 1.7 Introduction to C++- objects-classes-constructors and destructors	**7**
2.	**Operator overloading** 2.1 Friend functions 2.2 Type conversions 2.3 Templates 2.4 Inheritance 2.5 Virtual functions 2.6 Runtime polymorphism	**12**
3	**Exception handling** 3.1 Streams and formatted I/O 3.2 file handling 3.3 namespaces 3.4 String Objects 3.5 standard template library	**8**
4.	**Introduction to JAVA** 4.1 Bytecode, 4.2 Virtual machines 4.3 Objects 4.4 Classes 4.5 Javadoc 4.6 Packages 4.7 Arrays 4.8 Strings	**8**

5. Inheritance **10**

5.1 Interfaces and inner classes
5.2 Exception handling
5.3 Threads
5.4 Streams, and
5.5 I/O

Practical

Total Periods : 60
Classes : 4 P/W

Problems on C++ and Java:

Objects and classes
Declaring and creating objects
Constructors
Modifiers
Passing objects to methods
Instance variables and class variables
Instance method & class method
Scope of variables interface and packages

Introductory Problems on Class Inheritance Super classes and sub class
Calling super class constructors
Calling super class methods
Object class
Number class
Processing date and time

Class Templates and Exceptional handling

Reference Books:

1. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
2. Cay S. Horstmann, Gary Cornell, "Core JAVA volume 1", Eighth Edition, Pearson
3. K. Arnold and J. Gosling, "The JAVA programming language", Pearson Education,
4. D. S. Malik, "C++ Programming: From Problem Analysis to Program Design", Thomson Course Technology.

List of Equipments:

Hardware : Standalone PC
(for detail, please refer Annex – I)

Software : Java Compiler, Visual studio, JDK

WEB DESIGN

L	*T*	*P*	***Curri. Ref. No.: CSE503***
1	*1*	*6*	

Total Contact hrs : 120 ***Total marks: 150*** ***Theory: 50***

Theory: 15 *End Term Exam: 50*

Tutorial: 15 *P.A.: 0*

Practical: 90 ***Practical: 100***

Pre requisite: NIL *End Term Exam: 50*

Credit: 5 *P.A : 50*

Practical

Total Periods : 90

Classes : 6 P/W

1. Basics of Web Design

a) Focus on the customer
b) Working with your clients
c) FYI - information on domains
d) Web design patterns
e) Site development processes
   - Naming conventions
   - Purpose of a website
   - Planning your site

2. Design Principles

a) Design principles
b) Effective Page Layouts
c) Layout options
   - Using tables, layers, frames
   - Working with forms
   - Using CSS to add interest and flexibility to a design

3. Page Layout - Navigation

a) Principles of effective navigation
b) More than one way to navigate
c) Hierarchal organization
d) Task-based organization
e) Other ways to organize your navigation
f) Making navigation easy
   - bread crumbs
   - links, embedded & external
   - error messages
   - unified browsing hierarchy
   - high-visibility buttons
g) Accessibility issues

4. Managing Content

a) Speeding up your site
b) Assisting your visitors with task completion
c) Writing for search engines
d) Printable pages
e) Version control
f) Searching the site

5. Color and Graphics

a) Using color on your pages
   - flashing colors
   - bright colors
b) Pros and cons of background colors
c) Contrast
d) Do's and don'ts of Graphics
e) Dimension vs weight
f) Wrapping text around a graphic
g) Using Background graphics
h) Banners & moving objects

6. Credibility

a) Site branding
b) Privacy policies
c) Disclaimers
d) Email subscriptions

7. Site Management

a) Site organization
   - Organizing associated files
   - Keeping prior versions
b) Directory structure and organization
c) Too many cooks in the kitchen - version control

8. Final Steps & Extras

a) Testing your site
b) When you need help testing
c) Online research

9. **Form Validation using Javascript**

The laboratory session will consists of development of application using topics mentioned above in various web based application development.

Reference Books:

1) The complete reference HTML & XHTML by Powell – Mc Grew Hill
2) HTML & CSS Design and Build Website by Duckett – John Wiley & Sons
3) Mastering HTML & XHTML by Ray and Ray – BPB Publication

Reference Study material

1) www.w3schools.com
2) html.com
3) Dhtml.com

SOFTWARE ENGINEERING

L	*T*	*P*	***Curri. Ref. No.: CSE504***
3	*1*	*0*	

Total Contact hrs : 60
Theory: 45
Tutorial: 15
Practical:
Pre requisite: NIL
Credit: 4

Total marks: 100

Theory: 100
End Term Exam: 75
P.A.: 25
Practical:0
End Term Exam:0
P.A : 0

Theory
Total Period : 45
Period : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.0	**Introduction to Software Engineering** 1.1 The evolving role of software 1.2 Software crisis-problems and causes 1.3 Software engineering paradigms 1.4 Classic life cycle 1.5 Prototyping 1.6 Spiral Model 1.7 Generic view of software engineering	4
2.0	**Software Requirement Analysis** 2.1 Requirement analysis fundamentals 2.2 Structured analysis : Basic notation and its extension, object oriented analysis and data modeling, process modeling	6
3.0	**Software Design** 3.1 Evolution of software design 3.2 Design fundamentals: Abstraction, refinement, modularity, software architecture 3.3 Flow oriented design and object-oriented design	5
4.0	**Quality Assurance** 4.1 Software quality factor 4.2 Software quality Assurance (SQA) 4.3 SQA activities 4.4 Software reliability, errors and faults 4.5 Software reliability models	4
5.0	**Verification and Validation** 5.1 Software testing strategies & techniques 5.2 Elementary ideas of black box & white box testing	3

6.0	**Software Evaluation**	2
7.0	**Software Documentation**	3
8.0	**Software Project Management**	18
	8.1 Basic concepts of software project management process objectives, scope, estimation, COCOMO model	
	8.2 Project planning	
	8.3 Project scheduling, Gantt chart, pert chart	
	8.4 Managing people, project staffing, group working, working environment	
	8.5 Project monitoring, milestone, methods of project monitoring	
	8.6 Risk analysis, tracking and control, version management	
		45

REFERENCE BOOKS :

1. Software Engineering Beginners Approach – by Pressman – TMH
2. Software Engineering – by Pankaj Jalote – Narosa Pub. House
3. Fundamentals of Software Engg- Carlo Ghezzi, Mehdi Jazayeri, & Dino Mandrioli – PHI.
4. Software Engineering – by Sommerville – Addison-Wesley

INTERNETWORKING

L	*T*	*P*	***Curri. Ref. No.: CSE505***
3	*1*	*4*	

Total Contact hrs : 120 ***Total marks: 200*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*
Tutorial: 15 *P.A.: 25*
Practical:60 ***Practical:100***
Pre requisite: CSE407 *End Term Exam:50*
Credit: 6 *P.A : 50*

Theory
Total Period : 45
Period : 3 P/W

Sl. No.	***Topic***	***Period***
1.	**Introduction to Computer Networking**	**4**
	1.1 Need for Networking	
	1.2 Data transfer rates / bandwidth	
	1.3 Basics of communication – simplex, half duplex and full duplex communication	
	1.4 Chanel allocation, switching – circuit and packet	
	1.5 Multiplexing	
	1.6 OSI Reference Model (Revision)	
2.	**Network Topology**	**2**
	2.1 Network Topology for LAN – bus, ring, star	
	2.2 Network Topology for WLAN – adhoc, infrastructure, hybrid, point–to–point	
	2.3 Network Topology for WAN – hierarchical, mesh, peer–to–peer	
3.	**Network Media**	**3**
	3.1 Wired Media – fibre optics	
	3.2 Wireless Media – radio communication, cellular communication, WiFi, Bluetooth, infrared, microwave and satellite communication, Wireless LAN Standard, 802.11a/b/g/n network	
4.	**TCP / IP**	**15**
	4.1 Overview of TCP/IP	
	4.2 Internet Protocol	
	4.3 IP Addressing – IPv4 – Class A, Class B and Class C addressing	
	4.4 Classless Inter Domain Routing (CIDR) –sub-netting and super-netting	
	4.5 IPv6	
	4.6 Mobile IP	
	4.7 IPNAT	
	4.8 IP Sec	

5.	**Internet Routing Protocols**	**4**
	5.1 Routing Information Protocol – overview, standard, route determination, general operations	
	5.2 Open Shortest Path First – overview, standard, basic topology, link state database, area of routers	
6.	**Border Gateway Protocol**	**8**
	6.1 BGP overview and standards	
	6.2 BGP topology, speakers, and neighbour routers	
	6.3 BGP autonomous system and its types, traffic flow and routing policies	
	6.4 BGP route storage and advertisement	
	6.5 BGP path algorithm	
	6.5 BGP route determination	
	6.6 BGP operation and messaging	
7.	**Domain Name Space (DNS)**	**6**
	7.1 DNS concept and operation	
	7.2 DNS generic Top Level Domain	
	7.3 DNS country code Top Level Domain	
	7.4 DNS hierarchy	
	7.5 DNS registration, public administration, zones and authorities	
	7.6 DNS resolution and Reverse DNS resolution	
8.	**Regional Internet Registries (RIR)**	**3**
	8.1 Role of RIR	
	8.2 Function performed by RIR	
	8.3 Five RIR – APNIC, ARIN, LACNIC, AFRINIC, RIPENCC	
9.	**Firewall**	**2**
	9.1 Firewall Basics – types of threats, types of firewalls	
	9.2 Case Study – Cisco PIX, ASA, Linux based Firewalls	
10	**Virtual Private Network (VPN)**	**3**
	10.1 Basics of VPN	
	10.2 Security Issues in the Internet and solution with VPN	
	10.3 Various VPN solution in the WAN Environment	---
		45

Practical
Total: 60 hrs
Period: 4/wk

A. Network installation
LAN Installation and configuration
Selection of media and topology
Installation of NIC,
Wireless NIC Card (WiFI)
IP Address configuration,
Ping and Trace

Configuration of Networking Devices
Configuration of Switches (L2 & L3), Routers, Gateways, Proxy Server, Access Points (WiFi),

Configuration of VLAN, Firewall, VPN
Installation and Configuration of Wireless (WiFi) Secured Network

B. Network Programming
HTML, XML, Java Script, Elementary level of Socket Programming

Books:

1. Computer Networks - A.S. Tanenbaum – Prentice Hall – 2003
2. Data and Computer Communications – William Stallings – Pearson Education India
3. Wireless Communications and Networks – William Stallings – Prentice Hall
4. TCP/IP Guide - Charles M. Kozierok – No Starch Press – 2005
5. Firewall Fundamentals – Noonan, Dubrawsky – Pearson Edu. (Cisco – Press)
6. Internetworking with TCP/IP – Comer and Stevens
7. Virtual Private Networks – by Erwin, Scott, Wolfe – O'Reilly
8. Website of APNIC, AFRINIC, ARIN, LACNIC RIPENCC.

List of equipment

1) Desktop Computers
2) Servers
3) Network Interfacing Cards
4) Wireless PCI Card
5) Switches (L2 managed)
6) L3 switches
7) Router
8) Access-Points
9) Modem
10) Internet Connection through Broadband / Leased Line
11) Patch Panel
12) I/O Box
13) Patch cord
14) UTP Cable Cat 5 / Cat 6
15) RJ 45 / RJ 11 Connectors
16) Crimping tools
17) Punching tools
18) LAN Tester
19) Windows xp/vista / 7 / 8
20) Windows 2003 / 2008 server
21) Linux (Redhat /SuSE / Fedora) Desktop / Enterprise Edition

MULTIMEDIA TECHNOLOGY AND DESIGN

L	*T*	*P*	***Curri. Ref. No.: CSE506***
3	*1*	*4*	

Total Contact hrs : 120 ***Total marks: 200*** ***Theory: 100***
Theory: 45 *End Term Exam: 75*
Tutorial: 15 *P.A.: 25*
Practical:60 ***Practical:100***
Pre requisite: - CSE409 *End Term Exam:50*
Credit: 6 *P.A : 50*

Theory
Total Period : 45
Period : 3 P/W

Sl. No.	***Topic***	***Period***
1.	**Animation**	**10**
	1.1 Introduction and Background of Animation	
	1.2 Uses of Animation	
	1.3 Types of Animation – cell animation, path animation, 2D & 3D animation	
	1.4 Role of computers in animation	
	1.5 Key-frames and Tweening	
	1.6 Movement creation – coordinate system, transformations	
	1.7 Principles of Animations – squash and stretch, anticipations, staging, follow-through and overlapping , slow-in slow-out, arcs, timing.	
	1.8 Animation Techniques – onion skinning, motion cycling, masking, flipbook animation, sound addition.	
	1.9 3D Animation – modelling, camera and centre of interest(COI), movements of camera, and special effects.	
2.	**Compression**	**8**
	2.1 Need for Compression	
	2.2 Types of Compression – lossless and lossy, intra-frame and inter-frame,	
	2.3 Types of Redundancies – statistical, psycho-visual	
	2.4 CODEC	
	2.5 Lossless / Statistical Compression Techniques – entropy, RLE, Huffman, arithmetic coding, LZ, LZW DPCM coding	
	2.6 Lossy / Perceptual Compression Techniques – Transform, psycho-analysis, inter-frame corrélation,	
	2.7 JPEG image Coding Standard	
	2.8 MPEG Standard Overview	
3.	**CD Technology**	**4**
	3.1 CDROM digital data, CD-interactive, CDROM – extended architecture, PhotoCD, Video CD, CD-R, CD-RW.	
	3.2 DVD – specification, DVDROM, DVD-R, DVD-RW, single sided single layer, signal sided double layer, double sided single layer, double sided double layer.	

4. Multimedia Application Development **10**

4.1 Multimedia Software Life Cycle – feasibility study, requirement analysis, project planning and management, designing, implementation, integration, delivery and maintenance.
4.2 Conceptualization - subject matter/theme, target audience, objectives
4.3 Content Collection and Processing
4.4 Storyboard – guidelines for: text, visual element, motion video, animation, audio
4.5 Hardware and software for implementation.
4.6 Authoring Metaphors – slide show, book, windowing, timeline, network, icon metaphor.

5. Computer Games **10**

5.1 Video Game Console – Sony Play Station, Nintendo Game Cube, X-box
5.2 Genres
5.3 Game Design
5.4 Game Controller / Game Engine
5.5 Game Programming
5.6 Interactive Gaming

6. Virtual Reality **3**

6.1 Forms of Virtual Reality
6.2 Virtual Reality Application – perambulation, synthetic experience, realization.
6.3 Software Requirement - device drivers, development tools, navigation engine
6.4 Peripherals Devices – audio/visual, tracking, navigation devices
6.5 Virtual Reality Modelling Language (VRML)

45

Practical
Total Period : 60
Period : 4P/W

1. Desktop Publishing
Photoshop basics
Corel draw
Page Maker

2. Audio
Nature of sound
Techniques of recording and editing sound using popular audio software

3. Video Editing Basics
Picture transitions
Video and audio special effects
Current popular editing software

4. Animation

Principles of Animation
Various stages of production like script, story boarding etc
Working with flash – basic and advanced
Basics of 3D Max – modeling, texturing, advanced lighting, animation

5. Advanced 3D Graphics and Animation

Maya –polygon modeling, NURBS modeling, Advanced texturing, lighting
Creating 3D Characters and Animation
Generating Special effects using features of Maya

Reference Books:

1. Principles of Multimedia – Ranjan Parekh – Mc-Graw-Hill –2008
2. Multimedia Communications – Fred Halsell–Pearson Education Ltd – 2009
3. Multimedia Communication System: Techniques, Standards and Networks – by K.R. Rao, Z.S. Bojkovic, A. Milovanovic, Prentice Hall
4. Multimedia: From Wagner to Virtual Reality- by Randall Packer, Nortan
5. Virtual Reality –by H. Rheingold

LIST OF EQUIPMENT

Hardware :	Multimedia PC (for detail, please refer Annex – I)
Software : (Latest Version)	Adobe CS 5 Master Collection Director, Toolbook

TECHNICAL SEMINAR

L	*T*	*P*	***Curri. Ref. No.: CSE507***
0	*0*	*6*	

Total Contact hrs : 90	***Total marks: 100***	***Theory: 0***
Theory: 0		*End Term Exam: 0*
Tutorial: 0		*P.A.: 0*
Practical:90		***Practical:100***
Pre requisite: -		*End Term Exam:50*
Credit: 3		*P.A : 50*

To be decided by the Respective Institutes

INDUSTRIAL TRAINING

L *T* *P*
0 *0* *-*

Curri. Ref. No.: CSE508

Total Contact hrs : NA ***Total marks: 200***
Theory: 0
Tutorial: 0
Practical:-NA
Pre requisite: - as given in the table below
Credit: 10

Theory: 0
End Term Exam: 0
P.A.: 0
Practical:200
End Term Exam:0
P.A : 200

Course Code	Course	Pre-requisite	Duration	Examination Scheme (Practical)		Total Marks	Credits
				End Exam	**PA**		
508	Industrial Training	Student should in 4th Term or later	**1-wk orientation + 3-wks OJT**	**0**	**200**	**200**	**10**

PROJECT

L	*T*	*P*	***Curri. Ref. No.: CSE509***
0	*0*	*8*	

Total Contact hrs : 120 ***Total marks: 150*** ***Theory: 0***

Theory: 0 *End Term Exam: 0*

Tutorial: 0 *P.A.: 0*

Practical:120 ***Practical:150***

Pre requisite: - NIL *End Term Exam:0*

Credit: 4 *P.A : 150*

To be decided by the respective Institutes

ELECTIVE COURSES
FOR
COMPUTER SCIENCE AND ENGINEERING:
(Any TWO to be taken from Sl. No. 1-3 & any ONE from Sl. No. 4-5)

COMPUTER TROUBLESHOOTING AND MAINTENANCE

L	*T*	*P*	***Curri. Ref. No.: CSE601***
2	*1*	*4*	

Total Contact hrs : 105
Theory: 30
Tutorial: 15
Practical: 60
Pre requisite: -NIL
Credit: 5

Total marks: 150

Theory: 50
End Term Exam:50
P.A.: 0
Practical: 50
End Term Exam: 25
P.A : 25

Theory
Total Period : 30
Period : 2 P/W

1. Processor
- 1.1 Functional component of a microprocessor
- 1.2 Gerneral purpose and Special purpose registers
- 1.3 Stack and Instruction Pointers
- 1.4 Instruction set
- 1.5 Single / Dual / Quad Core Processor Core
- 1.6 RISC and CISC Processor

2. Memory
- 2.1 Main Memory: ROM and RAM
- 2.2 Static RAM – Cache memory
- 2.3 Dynamic RAM, DDR2 and DDR3 RAM
- 2.4 Front Side Bus and memory Interface
- 2.5 Memory hierarchy

3. Motherboard & Chipset
- 3.1 Functional Component of Motherboard
- 3.2 Memory slots
- 3.3 Hard Disk Controller
- 3.4 RAID Controller (SERVER)
- 3.5 Integrated Graphics Card
- 3.6 Integrated Sound Card

4. Interfaces
- 4.1 USB Ports 1.0, 2.0, 3.0
- 4.2 RS232, Comm ports,
- 4.3 Ethernet RJ45
- 4.4 Wireless LAN 802.11 a/b/g/n
- 4.5 PS-2
- 4.6 Fire ware 1394
- 4.7 5.1 Audio Interface 3.5mm jack
- 4.8 VGA / DVI
- 4.9 HDMI
- 4.10 Micro SD Card Slots

5. ROM Bios and Boot Strap Loader

5.1 Int 86x

5.2 Int DOSx

6. Peripherals

6.1 Working and Setup of Peripherals:

a) Printers
b) Scanners
c) Web cameras
d) Video capture card / Grabber
e) Sound Capture Card
f) 5.1 / 7.1 Channel Sound system
g) USB Wireless Dongle
h) Bluetooth Dongle

7. Memory Mapping Techniques

7.1 Introductory Concepts

Practical

Total Periods : 60
Classes : 4 P/W

1. Identification of Hardware Modules of PC
   a) Processor
   b) Motherboard
   c) SMPS
   d) CD / DVD / Blue Ray Disk Drive
   e) HDD, SCSI Controller, RAID Controller (for Server)
   f) Keyboard
   g) Mouse
   h) CRT / LCD / LED Monitors
   i) Interfaces : USB Ports 1.0, 2.0, 3.0, RS232, Comm ports, Ethernet RJ45, Wireless LAN 802.11 a/b/g/n, PS-2, Fire ware 1394, 5.1 Audio Interface 3.5mm jack, VGA / DVI, HDMI,

2. Identification, Configuration, and Installation of brand dependent devices
3. Installation of O.S. in standalone system, client / server architecture (Windows and Linux)
4. Installation of peripherals: Printers, Scanners, Mobile Setup, Bluetooth deivces
5. Maintenance of PC and Server System: Routine maintenance, Virus and spam attacks, Back-up and restoration
6. Troubleshooting: Identification of trouble with keyboard, mouse, display, RAM, HDD, SMPS
7. IP Address configuration: Wired and Wireless LAN, LAN Connectivity, Proxy setting
8. Network Equipment Configuration and troubleshooting : Switch, Router, Wifi Access Points,

REFERENCE BOOKS :

1. Hardware and Software of Personal Computers – by S.K. Bose, New Age International
2. Computer Troubleshooting – by K. MacRae, G. Marshal, Haynes Publishing.
3. Handbook of Computer Troubleshhoting – by M. Byrd, J. Pearson, R.A. Saigh, The GlenLake Publishing Company.

LIST OF EQUIPMENT

Hardware: Stand alone PC (for detail, please refer Annex – I)
Software: JDK, Visual Studio

JAVA PROGRAMMING LAB

L	*T*	*P*	***Curri. Ref. No.: CSE602***
2	*1*	*4*	

Total Contact hrs : 105 ***Total marks: 100*** ***Theory: 50***

Theory: 30 *End Term Exam:50*
Tutorial: 15 *P.A.: 0*
Practical: 60 ***Practical: 50***
Pre requisite: NIL *End Term Exam: 25*
Credit: 5 *P.A : 25*

Practical
Total Period : 60
Period : 4 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Java Fundamentals** Control Statements Lexical Issues (white space, identifiers, literals, comments, separators, keywords) Data types, variables, arrays, operators	
2.	**Class Fundamentals** Constructors, Destructor, Garbage Collection, Stack class, Method overloading, Inheritance, packages & interface, exception handling	
3.	**Multi-Threading Programming** Thread Model, Main thread, Creating a Thread(implementing runable thread, extending an approach) Multiple Thread using Alive( ), Joint( ), Suspend( ), Resume( ) Thread Priorities, Synchronization, Inter-Thread Communication	
4.	**Input/Output Applets** Buttons, label box, check box, radio button, combo box, list box, file list box, drive list box Handling Event (Processing Mouse events, handling keyboard events) Understanding the HTML Applet Tag (Code base, code, name, ALT, WIDTH, Align, V-space & H-space, param name, value)	
5.	**Introduction to AWT** Window Fundamentals (Component, container, panel, window, frame, canvas)	

REFERENCE BOOKS :

1. Core Java - Vol. I & II by Cay S. Horstman & Gary Cornell - Pearson Edn. Asia
2. An Introduction to JAVA Programming by Y. Daniel Liang – PHI.
3. Just JAVA 1.2 by Peter Vander Linder Addison Wesley.

LIST OF EQUIPMENT

Hardware: Stand alone PC (for detail, please refer Annex – I)
Software: JDK, Visual Studio

E-COMMERCE

L	*T*	*P*	***Curri. Ref. No.: CSE603***
2	*1*	*4*	

Total Contact hrs : 105 ***Total marks: 100*** ***Theory: 50***

Theory: 30 *End Term Exam:50*

Tutorial: 15 *P.A.: 0*

Practical: 60 ***Practical: 50***

Pre requisite: NIL *End Term Exam: 25*

Credit: 5 *P.A : 50*

Theory

Total Period : 30

Period : 2 P/W

UNIT	TOPIC/SUB-TOPIC	Total Hrs.
1.	**Basics of E-Commerce**	2
2.	**Architecture** Electronic Commerce: Framework , Media convergence of Application,	6
3.	**Technology** Electronic Data Interchange (EDI): concept, Application (legal security and privacy) Issues,, EDI and Electronic commerce Standardization and EDI, EDI Software implementation, Envelope for message Transport, Internet-based EDI	10
4.	**Applications** Consumer application Organization application Electronic payment System: Digital Systems, Token, Smart Cards, Credit Cards, Risks in Electronics Payment system, Designing electronic payment system	10
5.	**Payment Gateways and Their usage**	2

		30

Practical
Total Period : 60
Period : 4 P/W

Case Study and Reporting of the various e-commerce site functioning in domestic and international paradigm.

REFERENCE BOOKS :

1. E-Commerce: The cutting edge of business – by K.K. Bajaj, D.Nag TMH
2. E-Commerce – by S. Pankaj, APH Publishing Corporation
3. E-Commerce: An Introduction – Amir Manzoor, Lambert Academic Publishing
4. E-Commerce: A Knowledge Base – by B.C. Satterlee, Writers Club Press.

WIRELESS AND MOBILE COMMUNICATION

L	*T*	*P*
3	*0*	*0*

Curri. Ref. No.: CSE604

Total Contact hrs : 45 ***Total marks: 100*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*

Practical: 0 *P.A.: 25*

Pre requisite: NIL ***Practical: 0***

Credit: 3 *End Term Exam: 0*

P.A : 0

Theory

Total Period : 45

Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Functional architecture** Coded and encoded digital communication system architecture Types of network and services, Performance criterion and link budgets, PSD , Non-coherent receivers,	7
2.	**Basic of Communications** Data pulse stream,Scalar and vector communications over memory less channel, scalar reciever, Shannon channel coding theorem, linear block codes, convolutional coded digital communication system, Bit Error Rate, Performance, Detection criterion Inphase and Quadrature phase modem, QAM, QPSK, QBM, CPM, FSK, MSK	9
3.	**Wireless Transmission** Wired and wireless, Mobility of users and equipments, Electromagnetic Spectrum, Radio and Microwave communication, Infrared and Millimetre waves, Lightwave Transmission.	7
4.	**Mobile Connectivity** Cells, Framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing application, Architecture of BSS, BSC, MSE, GMSE, Authentication, Mobile database-Protocol, scope, tools, and technology	9
5.	**Mobile Technology** GSM, CDMA, WCDMA, GPRS, EDGE, HSDPA, HSUPA (3G) and LTE (4G) Mobile communications	8
6.	**M-Business** E/M-transaction, M-money, PKI infrastructure for E-transaction	5

		45

Reference Books:

1) Mobile Communication by Jochen Schiller – Pearson Education
2) Mobile Computing by Raj Kamal – Oxford University Press

PARALLEL & DISTRIBUTED COMPUTING

L	*T*	*P*	***Curri. Ref. No.: CSE605***
3	*0*	*0*	

Total Contact hrs : 45 ***Total marks: 100*** ***Theory: 100***

Theory: 45 *End Term Exam: 75*

Practical: 0 *P.A.: 25*

Pre requisite: NIL ***Practical: 0***

Credit: 3 *End Term Exam: 0*

P.A : 0

Theory

Total Period : 45

Periods : 3 P/W

UNIT	TOPIC/SUB-TOPIC	TOTAL HRS.
1.	**Introduction to Parallel & Distributed Systems.**	4
	1.1 Distributed System and Real-Time System	
	1.2 Parallel Systems and Flynn's classification	
	1.3 Design Issues for different types of models	
	1.3 Sample Distributed Application.	
2.	Memory Management for Distributed Systems	5
	2.1 Review of Centralized Memory Management.	
	2.2 Simple Memory Model and Shared Memory Model	
	2.3 Distributed Shared Memory.	
	2.4 Memory Migration.	
3.	***Inter-process Communication***	6
	3.1 Selection Factors	
	3.2 Message Passing, Shared Memory, Pipes, Sockets.	
	3.3 Remote Procedure Calls	
	3.4 Static and Dynamic Interconnection Networks	
4.	**Concurrency Control. and Distributed Synchronization.**	8
	4.1 Mutual Exclusion and Critical Regions	
	4.2 Semaphores, Monitors and Locks	
	4.3 Token-Passing and Mutual Exclusion	
	4.5 Introduction to Global Time and Physical Clocks	
	4.6 Network Time Protocol (NTP), Logical Clocks	
5.	**Distributed File Systems.**	4
	5.1 Distributed Name Service	
	5.2 Distributed File Service	
	5.3 Distributed Directory Service. NFS. X.500.	
6.	**Scalar and Vector Processing**	3
	6.1 Definitions	
	6.2 Linear and non-linear pipeline processors	
	6.3 Super-pipelining	
	6.4 Vector processing principle	

7.	**Parallel Algorithms**	10
	7.1 PRAM model of computation	
	7.2 Broadcast and Prefix sums	
	7.3 Permutation algorithms	
	7.4 Parallel sorting	
8.	**Distributed Security.**	5
	8.1 Crytography and Digital Signatures	
	8.2 Authentication.	
	8.3 Access Control (Firewalls)	

		45

REFERENCE BOOKS :

1. Computer Architecture & Organisation – by Hayes – McGrawHill
2. Computer Architecture & Parallel Processing – by Hwang & Briggs – McGrawHill
3. Design Efficient Algorithms for Parallel Computers – by Quinn - McGrawHill

Annexure - A

List of Experts

1	Prof. R. Dasgupta	Dept. of CSE	NITTTR, Kolkata
2	Prof. S. Mazumdar	Dept. of CSE	NITTTR, Kolkata
3	Prof S. Roy	Dept. of CSE	NITTTR, Kolkata
4	Prof J.K. Mandal	Dept. of CSE	Kalyani University
5	Prof. N. Chaki	Dept. of CSE	Calcutta University
6	Prof. S. Chowdhury	Dept. of CSE	Calcutta University
7	Prof A. Chakraborty	School of IT	Calcutta University
8	Prof. P.N. Basu	School of Edu. Tech.	Jadavpur University
9	Prof. U. Kar	Curriculum Dev. Centre	NITTTR, Kolkata
10	Prof. R. Chatterjee	Dept. of CSE	NITTTR, Kolkata

List of Contributors

1	Prof. S.K. Naskar	Curriculum Dev. Centre	NITTTR, Kolkata
2	Prof. P. Sarkar	Dept. of EE	NITTTR, Kolkata
3	Sri. S. Bengia	Dept. of Technical Education & Training	Arunachal Pradesh
4.	Prof. A.K. Tripathy	Principal	Rajiv Gandhi Polytechnic, Itanagar
5.	Faculty Members	Dept. of CSE	Rajiv Gandhi Polytechnic, Itanagar

Annexure - I

		Item		Configuration
		Desktop Computer		**Multimedia Personal Computer**
A		**Base Machine**		
	1	Processor	:	Intel Core i5-2500, 3.3 GHz, 6 MB Cache, 4 cores or higher
	2	Chipset	:	Intel Q67 Express or higher
	3	Memory/Slots	:	4 GB 1333MHz DDR3 SDRAM with 16 GB Expandability / 4DIMM
	4	Hard Drive	:	1TB 7200 rpm Serial ATA HDD or higher
	5	Optical Drive	:	16x Max DVD+/- RW with dual layer write capabilities
	6	Audio	:	Realtek High Definition integrated audio
	7	Video Controller	:	Nvidia GeForce Video card with 1/ 2 GB RAM and VGA, DVI and HDMI interfaces
	8	Keyboard	:	USB or PS/2 Standard Keyboard 104 keys
	9	Mouse	:	USB or PS/2 Optical mouse
	10	Ports	:	8 USB ports, 1 serial, 1 parallel
	11	Wi Fi connection	:	Wireless 802.11 a/b/g/n compliant PCI wireless card
	12	LAN connection	:	10/100/1000 Mbps Ethernet Card integrated
	13	Cabinet	:	Mini-tower
	14	Monitor	:	19" wide screen flat panel LCD/LED monitor with Analog and DVI input
	15	Warranty & support	:	3 years onsite comprehensive warranty with next business day support
	16	Operating System	:	Microsoft Windows 7 Professional (64 bit version) (Preloaded)
	17	Antivirus	:	Norton Internet Security with upgrades /updates for 36 months
	B	**Add-on Items**		
	1	Web Cam	:	2.0 Megapixel or higher web camera with USB interface
	2	Headphone	:	Stereo headphone with microphone
	3	Speakers	:	5.1 channel speaker system of reputed brand
	4	UPS (optional)	:	650VA UPS with 15-20 minutes battery backup.
	C	**Software**		
	1	Application Software	:	Microsoft Office (latest Academic Version)
			:	Microsoft Visual Studio (Latest Academic Version)

SAMPLE PATH

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM -1

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	G101	Communication Skill-I		3	0	0	75	10	15	0	0	0	100	3
2	G103	Mathematics-I		3	1	0	75	10	15	0	0	0	100	4
3	G105	Physics -I		3	0	2	75	10	15	25	25	0	150	4
4	G107	Chemistry - I		3	0	2	75	10	15	25	25	0	150	4
5	G201	Engineering Drawing-I		1	0	3	50	0	0	0	50	0	100	3
6	G203	Workshop Practice-I		1	0	3	0	0	0	50	50	0	100	3
7	G207	Fundamentals of Electrical & Electronics Engg.		3	0	2	75	10	15	25	25	0	150	4
8	G109	NCC I/NSS I		0	0	2	0	0	0	25	25	0	50	1
TOTAL				**17**	**1**	**14**	**425**	**50**	**75**	**150**	**200**	**0**	**900**	**26**

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM - 2

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	G102	Communication Skill-II	G101	2	1	2	50	0	0	25	25	0	100	4
2	G104	Mathematics-II		3	1	0	75	10	15	0	0	0	100	4
3	G106	Physics-II	G105	3	0	2	75	10	15	25	25	0	150	4
4	G108	Chemistry - II	G107	3	0	2	75	10	15	25	25	0	150	4
5	G202	Engineering Drawing-II	G201	1	0	3	50	0	0	0	50	0	100	3
6	G204	Workshop Practice-II	G203	1	0	3	0	0	0	50	50	0	100	3
7	CSE206	Introduction to C-Programming *		3	1	4	75	10	15	50	50	0	200	6
8	G110	NCC II/NSS II		0	0	2	0	0	0	25	25	0	50	1
TOTAL				**16**	**3**	**18**	**400**	**40**	**60**	**200**	**250**	**0**	**950**	**29**

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM - 3

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assignment		Sessional	Viva		
1	CSE401	Digital Electronics	–	3	1	2	75	10	15	25	25	0	150	5
2	CSE403	Data Structure	CSE206	3	1	2	75	10	15	25	25	0	150	5
3	CSE503	Web Design	–	1	1	6	50	0	0	50	50	0	150	5
4	CSE404	Communication Theory	–	3	1	0	75	10	15	0	0	0	100	4
5	G301	Environmental Education* (Softcore – I)		3	0	0	75	10	15	0	0	0	100	3
6	G205	Engineering Mechanics		3	0	0	75	10	15	0	0	0	100	3
TOTAL				**16**	**4**	**10**	**425**	**50**	**75**	**100**	**100**	**0**	**750**	**25**

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM - 4

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assign-ment		Sessional	Viva		
1	CSE504	Software Engineering	–	3	1	0	75	10	15	0	0	0	100	4
2	CSE402	Computer Organization	–	3	1	0	75	10	15	0	0	0	100	4
3	CSE406	Operating system	CSE402, CSE403	3	1	2	75	10	15	25	25	0	150	5
4	CSE407	Computer Networks	CSE404	3	1	2	75	10	15	25	25	0	150	5
5	CSE501	DBMS	CSE403	3	1	4	75	10	15	50	50	0	200	6
6	CSE502	Object Oriented Programming	CSE206	3	1	4	75	10	15	50	50	0	200	6
TOTAL				**18**	**6**	**12**	**450**	**60**	**90**	**150**	**150**	**0**	**900**	**30**

*** Compulsory Soft core**

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM - 5

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assign-ment		Sessional	Viva		
1	CSE405	Microprocessor	CSE401	3	1	3	75	10	15	25	25	0	150	5
2	CSE408	Computer Graphics	–	3	1	0	75	10	15	0	0	0	100	4
3	CSE505	Internetworking	CSE407	3	1	4	75	10	15	50	50	0	200	6
4	CSE409	Principles of Multimedia	–	3	1	4	75	10	15	50	50	0	200	6
5	CSE60_	Elective –I *	–	2	1	4	50	0	0	25	25	0	100	5
TOTAL				**14**	**5**	**15**	**350**	**40**	**60**	**150**	**150**	**0**	**750**	**26**

***Any one Course to be taken from CSE601, CSE602 and CSE603**

SAMPLE PATH FOR DIPLOMA PROGRAMME IN
COMPUTER SCIENCE AND ENGINEERING FOR THE STATE OF ARUNACHAL PRADESH
(FOR 10+ STUDENT)

TERM - 6

Sl. No.	Code	Course	Study Scheme				Evaluation Scheme						Total Marks	Credit
			Pre-requisite	Contact Hour/Week			Theory			Practical				
				L	T	P	End Exam.	Progressive Assessment		End Exam.	Progressive Assessment			
								Class Test	Assign-ment		Sessional	Viva		
1	CSE506	Multimedia Technology & Design	CSE409	3	1	4	75	10	15	50	50	0	200	6
2	G302 (A/B/C/ D/E/F)	Soft-Core-II		3	0	0	75	10	15	0	0	0	100	3
3	CSE60_	Elective – II*	–	2	1	4	50	0	0	25	25	0	100	5
4	CSE60_	Elective – III**	–	3	0	0	75	10	15	0	0	0	100	3
5	CSE507	Technical Seminar	–	0	0	6	0	0	0	0	50	50	100	3
6	CSE508	Industrial Training	As per Ind. Trg. table	0	0	–	0	0	0	0	100	100	200	10
7	CSE509	Project	–	0	0	8	0	0	0	0	100	50	150	4
TOTAL				**11**	**2**	**22**	**275**	**30**	**45**	**75**	**325**	**200**	**950**	**34**

***Any one Course to be taken from CSE601, CSE602 and CSE603 except taken in Elective –I**
** **Any one Course to be taken from CSE604 and CSE605**