NATIONAL UNIVERSITY

Syllabus

4 year B.Sc. (Hons.) in Computer Science and Engineering

Effective from the Session : 2006-2007

National University
Computer Science & Engineering (CSE) 4 years Hons.
Syllabus Outline
Effective from Session 2009-2010

1st Year:

1st Semester:

Course Code	Title of the Course	Credits
CSE-111	Introduction to Computer System	3
CSE-112	Programming Language	3
CSE-113	Programming Language Practical	1.5
CSE-114	Physics (Electricity and Magnetism)	3
CSE-115	Differential Calculus and Coordinate Geometry	3
CSE-116	English	3
	Total:	**16.5**

2nd Semester:

Course Code	Title of the Course	Credits
CSE-121	Data Structure	3
CSE-122	Data Structure Practical	1.5
CSE-123	Introduction to Electrical Engineering	3
CSE-124	Introduction to Electrical Engineering Practical	1.5
CSE-125	Integral Calculus and Differential Equation	3
CSE-126	Statistics and Probability	3
CSE-127	Discrete Mathematics	3
	Total	**18**

2nd Year:

3rd Semester:

Course Code	Title of the Course	Credits
CSE-211	Object Oriented Programming	3
CSE-212	OO Programming Language Practical	1.5
CSE-213	Operating System	3
CSE-214	Digital Logic Design	3
CSE-215	Digital Logic Design Practical	1.5
CSE-216	Mathematics for CSE	3
CSE-217	Electronic Devices and Circuits	3
CSE-218	Electronics Devices and Circuits practical	1.5
CSE-219	Basic Accounting	3
	Total	**22.5**

4th Semester

Course Code	Title of the Course	Credits
CSE-221	Algorithm Design	3
CSE-222	Algorithm Design Practical	1.5
CSE-223	Database Management System	3
CSE-224	Database Management System practical	1.5
CSE-225	Computer Organization & Architecture	3
CSE-226	Data Communications	3
CSE-227	Economics	3
	Total	**18**

3rd Year

5th Semester:

Course Code	Title of the Course	Credits
CSE-311	Theory of Computation	3
CSE-312	Microprocessor & Assembly Language	3
CSE-313	Assembly Language Practical	1.5
CSE-314	Engineering Mathematics	3
CSE-315	Sociology	3
CSE-316	Technical Writing & Communications	3
	Total	**16.5**

6th Semester

Course Code	Title of the Course	Credits
CSE-321	Software Engineering	3
CSE-322	Software Engineering Practical	1.5
CSE-323	Numerical Analysis	3
CSE-324	Computer Graphics & Multimedia	3
CSE-325	Computer Graphics and Multimedia Practical	1.5
CSE-326	Compiler Design	3
CSE-327	Compiler Design Practical	1.5
CSE-328	System Analysis and Design	3
	Total	**19.5**

4th Year:

7th Semester:

Course Code	Title of the Course	Credits
CSE-411	Computer Networking	3
CSE-412	Computer Networking Practical	1.5
CSE-413	Artificial Intelligence and Neural Network	3
CSE-414	Parallel and Distributed Processing	3
CSE-415	Peripheral and Interfacing	3
CSE-416	Peripheral and Interfacing Practical	1
CSE-417	Digital Signal Processing	3
	Total	**17.5**

4th Year

8th Semester

Course Code	Title of the Course	Credits
CSE-421	Web Engineering	3
CSE-422	Web Engineering Practical	1.5
CSE-423	Computer and Network Security	3
CSE-42x	Elective Course *	3
CSE-499	Project **	6
	Total	**16.5**

** Project Work must be started in 7th Semester.

* CSE-42X: Optional Courses (Any one)
CSE-424: Image Processing
CSE-425: VLSI Design
CSE-426: Simulation and Modeling
CSE-427: E-Commerce

Total Credit: 145

CHAPTER 1

GENERAL INFORMATION, RULES AND REGULATIONS FOR UNDERGRADUATE PROGRAMME

1.1 Introduction

National University pursues a policy of continuous updating and improving the new four-year course curricula having 8(eight) semesters carrying total credits 145 for bachelor's degree in Computer Science and Engineering (B.Sc.Engg.). This is to take into account the modern developments in different disciplines of study, especially in the field of Computer Science and Engineering, where things move too fast. Detailed syllabuses for all the courses have been framed keeping in view the objectives of National University in this regard. Computer Science and Engineering being a major discipline has to be considered in a special way, as it has got a professional backing and a large employer group needing the services of its graduates.

1.2 Admission

Students will be admitted in the first semester, first year of Computer Science and Engineering (CSE) in affiliated colleges / institutes as per rules of the National University.

Students passing HSC in the current year or one year ago with minimum GPA 2.0 in SSC and HSC (Science/Diploma in Engineering/Equivalent) examination having at least "C" grade in Physics and Mathematics can apply. Students passing General Certificate Examination (GCE) in at least 3 subjects in "O" level and 2 in "A" level having at least "C" grade in Physics and Mathematics can apply. One year break of study is acceptable.

1.3 Duration of Each Semester

The duration of each semester will be 18 weeks whose breakdown is as follows:

Classes	14 Weeks
Recess before Semester Final Examination	2 Weeks
Semester Final Examination (approximately)	2 Weeks
Total	**18 weeks**

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1.4 Course Designation System

Each course is designated by a three letter code identifying the department offering it, followed by a three-digit number having the following interpretation:

- The first digit indicates Year.
- The second digit indicates Semester.
- The last digit indicates courses number.

1.5 Assignment of Credits

The assignment of credits to a theoretical course follows a different rule from that of a practical course.

- Theoretical Courses: One lecture of 1-Hour duration per week per semester is equivalent to 1.0 credit.
- Practical Courses: One lab session of 3-Hour duration per week per semester is equivalent to 1.5 credit. 1 credit is equivalent to two hours of lab work per semester per week.
- The project must be initiated in 7^{th} semester.

1.6 Types of Courses

In CSE, there are two types of courses, namely i) core courses, which form the nucleus of the bachelor's degree program and General Education (GED) courses, the study of which will be useful for the students to grow as a good citizen with social values and norms. A student has to complete the entire designated courses for the 0award of degree.

1.7 The Grading System

The total performance of a student in a given course is based on a scheme of continuous assessment. For theory courses this continuous assessment is made through a set of quizzes, class evaluation, class participation, homework assignment and a semester final examination. The assessment in laboratory / practical courses is made through observation of the student at work during the class, viva-voce during laboratory hours and quizzes.

Each course has a certain number of credits, which describes its corresponding weights. A letter grade with a specified number of grade points is awarded to each course for which a student is registered. A student's performance is measured both by the number of credits completed satisfactorily and by the weighted average of the grade point earned. A minimum grade point average

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(GPA) is essential for satisfactory progress. A minimum number of earned credits also have to be acquired in order to qualify for the degree.

Letter grades and corresponding grade points will be awarded in accordance with the provisions shown below:

Letter Grade	Grade Point	Numerical Grade
A+	4.00	80% and above
A	3.75	75% to less than 80%
A⁻	3.50	70% to less than 75%
B+	3.25	65% to less than 70%
B	3.00	60% to less than 65%
B⁻	2.75	55% to less than 60%
C+	2.50	50% to less than 55%
C	2.25	45% to less than 50%
D	2.00	40% to less than 45%
F*	0.00	less than 40%
* Subject in which the student gets F grades shall not be counted towards credit hours requirements and for the calculation of Grade Point Average (GPA).		

1.8 Examination Rules

There will be at least two in-course examinations to be conducted by the college/institutes for each course and marks along with the grade be submitted to the Examination Controller of NU. Semester final examination will be conducted by the National University on six months basis for each semester. Semester final examination of each theoretical course will be held for 3 hours and there will have 6 questions in which 4 questions must be answered. Each question carrying 20 marks should contain two or more parts (e.g 1.(a), 1(b),1(c), ...).Two examiners will evaluate the semester final examination scripts separately. If the variation of marks of two examiners is 20% or more, the third examiner will be appointed to reexamine the scripts. The marks will be finalized by averaging of minimum variation of two examiners.

1.9 Distribution of Marks for Theoretical Courses

Twenty percent (20%) of marks of all theoretical courses shall be allotted to two in-course examinations. The answer scripts of in-course examinations are sent to the Controller of Examination of National University if required. The rest of the marks (80%) for each theoretical course will be allotted to the Semester Final Examination, which will be conducted centrally by the National University. There are internal and external examiners for each course in the

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Semester Final Examination of three hours duration. Distribution of marks for a given theoretical course is as follows:

In-course examinations	10%+10% = 20%
Semester Final Examination (3-Hour Duration)	80%
Total Marks	**100%**

1.10 Distribution of Marks for Practical Courses

The practical semester final examinations have to be conducted by internal and external examiners. Practical Final Examination that is conducted centrally by the National University will be held on 60 marks for each course. Marks distribution of each practical course is stated below.

In-course examination (Practical)	40%
Semester Final Examination (3 hours)	60%
Total	**100%**

Distribution of 60% Practical Marks:

Electronics/ Hardware/ Communication/ Equivalent others lab	Total (60%)	Programming/ Software/ Equivalent others lab	Total (60%)
Design	15%	Algorithm	15%
Circuit Implementation	20%	Coding	20%
Result	15%	Result	15%
Experiment Related Viva	10%	Experiment Related Viva	10%

1.11 Evaluation of Project Work

The evaluation of the project work, for grading will be as follows

1. Project Defense 40% of marks
2. Project Report 60% of marks

A panel of examines prepared by exam control appointed by NU, will conduct the project defense and also examine the project report. The project evaluation can be conducted by one, or more centers, selected by authority of NU. At least two members for the panel of examines must be present for project defense and evaluation.

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1.12 Calculation of GPA

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed / completed by a student. For example, if a student passes / completes n courses in a semester having credits of C_1, C_2, ..., C_n and his/her grade points in these courses are G_1, G_2, ..., G_n respectively, then

$$GPA = \frac{\sum_{i=1}^{n} C_i * G_i}{\sum_{i=1}^{n} C_i}$$

The Cumulative Grade Point Average (CGPA) is the weighted average of the GPA obtained in all the semesters passed / completed by a student. For example, if a student passes / completes n semesters having total credits of TC_1, TC_2,... TC_n and his/her GPA in these semesters are GPA_1, GPA_2, ..., GPA_n respectively then

$$CGPA = \frac{\sum_{i=1}^{n} TC_i * GPA_i}{\sum_{i=1}^{n} TC_i}$$

1.13 Numerical Examples of Computing GPA and CGPA

1.13.1 Example for Computing GPA

Suppose a student has completed eight courses in a term and obtained the following grades:

Course	Credits, Ci	Grade	Grade Points, G_i	C_i*G_i
CSE 101	2.00	A+	4.00	8.000
CSE 102	3.00	A+	4.00	12.000
CSE 103	1.50	A	3.75	5.625
CSE 104	3.00	B	3.00	9.000
CSE 105	1.50	A-	3.50	5.250
CSE 106	3.00	A+	4.00	12.000
CSE 107	4.00	A	3.75	15.000
CSE 108	1.50	A-	3.50	5.250
Total	**19.50**			**72.125**

GPA = 72.125/19.50 = 3.7

1.13.2 Example for Computing CGPA

Suppose a student has completed four semesters and obtained the following GPA : .

PART	Semester	Credit Hours Earned, TC_i	GPA Earned, GPA_i	GPA_i*TC_i
1	I	19.50	3.70	72.150
1	II	20.50	3.93	80.565
2	III	21.25	3.96	84.150
2	IV	20.25	4.00	81.000
Total		**81.50**		**317.865**

$$CGPA = 317.865/81.50 = 3.90$$

1.14 Minimum Earned Credit and GPA Requirement for the Degree Award

Minimum credit hour requirement for the award of the bachelor's degree in engineering (B.Sc. Engg.) will be decided National University. However, at least 145.5 credit hours for engineering must be earned to be eligible for the graduation.

The minimum GPA requirement for the Bachelor Degree Award in engineering is 2.20.

CHAPTER 2
COURSE REQUIRMENTS FOR UNDERGRADUATE COMPUTER SCIENCE AND ENFINEERING STUDENTS

Undergraduate students of Department of Computer Science and Engineering have to follow a particular course schedule, which is given in this chapter according to semester –wise distribution of courses:

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1ST YEAR 1ST SEMESTER
(1st SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-111	Introduction to Computer System	3	-	3
CSE-112	Programming Language	3		3
CSE-113	Programming Language Practical	-	3	1.5
CSE-114	Physics (Electricity and Magnetism)	3	-	3
CSE-115	Differential Calculus and Co-ordinate Geometry	3	-	3
GED-116	English	3	-	3
	Total	15	3	16.5

1ST YEAR 2nd SEMESTER
(2nd SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-121	Data Structure	3		3
CSE-122	Data Structure Practical	-	3	1.5
CSE-123	Introduction to Electrical Engineering	3	-	3
CSE-124	Introduction to Electrical Engineering Practical		3	1.5
CSE-125	Integral Calculus and Differential Equation	3	-	3
CSE-126	Statistics and Probability	3		3
CSE-127	Discrete Mathematics	3		3
	Total	15	6	18

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2nd YEAR 1ST SEMESTER
(3rd SEMESTER)

Course Name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-211	Object Oriented Programming	3		3
CSE-212	OO Programming Language Practical	-	3	1.5
CSE-213	Operating System	3	-	3
CSE-214	Digital Logic Design	3	-	3
CSE-215	Digital Logic Design Practical		3	1.5
CSE-216	Mathematics for CSE	3		3
CSE-217	Electronic Devices and Circuits	3		3
CSE-218	Electronic Devices and Circuits Practical		3	1.5
GED-219	Basic Accounting	3	-	3
	Total	18	9	22.5

2nd YEAR 2nd SEMESTER
(4th SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-221	Algorithm Design	3	-	3
CSE-222	Algorithm Design Practical		3	1.5
CSE-223	Database Management System	3	-	3
CSE-224	Database Management System Practical	-	3	1.5
CSE-225	Computer Organization and Architecture	3	-	3
CSE-226	Data Communications	3	-	3
GED-227	Economics	3	-	3
	Total	15	6	18.0

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3rd YEAR 1ST SEMESTER
(5th SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-311	Theory of Computation	3		3
CSE-312	Microprocessor and Assembly Language	3	-	3
CSE-313	Assembly Language Practical	-	3	1.5
CSE-314	Engineering Mathematics	3	-	3
GED-315	Sociology	3	-	3
GED-316	Technical Writing & Communications	3	-	3
	Total	15	3	16.5

3rd YEAR 2nd SEMESTER
(6th SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-321	Software Engineering	3	-	3
CSE-322	Software Engineering Practical		3	1.5
CSE-323	Numerical Analysis	3	-	3
CSE-324	Computer Graphics & Multimedia	3	-	3
CSE-325	Computer Graphics and Multimedia Practical	-	3	1.5
CSE-326	Compiler Design	3	-	3
CSE-327	Compiler Design Practical		3	1.5
CSE-328	System Analysis and Design	3	-	3
	Total	15	9	19.5

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4th YEAR 1ST SEMESTER
(7th SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-411	Computer Networking	3	-	3
CSE-412	Computer Networking Practical	-	3	1.5
CSE-413	Artificial Intelligence and Neural Network	3		3
CSE-414	Parallel and Distributed Processing	3	-	3
CSE-415	Peripheral and Interfacing	3		3
CSE-416	Peripheral and Interfacing Practical		2	1
CSE-417	Digital Signal Processing	3		3
	Total	15	5	17.5

4th YEAR 2nd SEMESTER
(8th SEMESTER)

Course name	Course title	Hours/Week		Credit
		Theory	Practical	
CSE-421	Web Engineering	3	-	3
CSE-422	Web Engineering Practical	-	3	1.5
CSE-423	Computer and Network Security	3		3
CSE-42X	Elective Course	3		3
CSE-499	*Project	-	12	6
	Total	9	15	16.5

***Project work must be started in 7th semester.**

CSE-42X: Optional Courses (Any one)

CSE 424 Image Processing
CSE 425 VLSI Design
CSE 426 Simulation and modeling
CSE 427 E-Commerce

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Summary:

Year/ Semester	Hours/Week		Credit		Credit	Number of Theory Courses	Number of Practical Courses
	Theory	Practical	Theory	Practical			
1st Year 1st Semester	15	3	15	1.5	16.5	5	1
1st Year 2nd Semester	15	6	15	3	18	5	2
2nd Year 1st Semester	18	9	18	4.5	22.5	6	3
2nd Year 2nd Semester	15	6	15	3	18	5	2
3rd Year 1st Semester	15	3	15	1.5	16.5	5	1
3rd Year 2nd Semester	15	9	15	4.5	19.5	5	3
4th Year 1st Semester	15	5	15	2.5	17.5	5	2
4th Year 2nd Semester	9	15	9	7.5	16.5	3	2
Total	117	56	117	28	145	39	16

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1st YEAR 1st SEMESTER

CSE-111 Introduction to Computer System

3 hours in a week, 3.00 Cr.

Introduction: Data & Information, History, Basic organization of computer, Computer generations, Types of computer: Main frame, Mini and Micro computer, Different types of micro computer, Simplest & Expanded Computer System, Number systems, Binary, Hexadecimal and Octal numbers, A Modern Overview of Computers , Some Modern Computing Ideas, Types of computer buses.
Hardware & Software: Hardware, Classification of hardware, Types of software, Systems software, Operating system, Editors, Assemblers, Compilers, Interpreters, System Utilities, Application packages.
Input Device Techniques: Keyboard, Touch Screen, Light pen, Mouse, Pen Input Method, Graphics Table, Joysticks, Barcodes, OCR System, Scanner, Mark Sense Reader, Magnetic Ink character recognition, Digital Camera, Speech Input.
Output Device Techniques: Monitor, printer, Graphics output devices.
Storage Techniques: Primary storage device and techniques, Secondary storage device and techniques.
Operating System: Basic Concept, Types of operating system, Batch, Multi-tasking, Multi-processing, Time sharing & Real time operating system.
Modern Communication Systems: Computer Networks, Types of computer network, Network topology, International Network Standards.
Programming Concept: Problem Analysis, Algorithm build-up, Flowcharts, High level Language Features, Function and Procedure.

Reference Books:

01. Understanding Computer Science for Advance Level (4th Edition).- Ray Bradly
02. **Computer Fundamentals** (4th Edition).-Pradeep K. Sinha
03. **Computers and Information System** (5th Edition).- Sarah B. Hutchinsonb and Stacey C. Sawyer
04. **Computer Fundamental**, M. Lutfar Rahman and M. Alamgir Hossain.

CSE-112 Programming Language

3 hours in a week, 3.00 Cr.

Overview of C, Constants, variables and data types: Operator & Expression: Managing Input & Output Operators: Decision making and branching: Decision making and

looping; Arrays; Handling of character strings; User-defined functions; Structure and Union; Pointers; File management.

Reference Books:

01. E. Balagurusamy, "**Programming in ANSI C"**
02. Yamath Kanathkar, "Let US C"
03. Yamath Kanathkar, "**Pointer in C**"
04. Herbert Schildt, "**Turbo C**"

CSE-113 Programming Language Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-112

Overview of C; Constants; variables and data types; Operator & Expression; Managing Input & Output Operators; Decision making and branching; Decision making and looping; Arrays; Handling of character strings; User-defined functions; Structure and Union; Pointers; File management.

CSE-114 Physics (Electricity and magnetism)

3 hours in a week, 3.00 Cr.

Charge, Electric field & Gauss's Law: Simple phenomena in electrostatics, Electrostatic induction and charge density; Coulomb's law; Electric field & field strength; Point charge in an electric field; Dipole in an electric field; Electric flux; Gauss's law and some applications; Electric potential ; Potential due to a point charge; Equipotential surfaces; Potential energy; Potential gradient; Capacitance and its calculation; Parallel plate capacitor with dielectric; Dielectric & Gauss's law; Electric vectors; Energy stored in an electric field.
Electric current, Simple circuits and Electrical Measurements: Current and Ohm's law; E.M.F. and potential difference; Whetstone bridge; Simple RC and RL circuits; The potentiometer; Moving coil galvanometer; Ammeter; Voltmeter; Multimeter; Wattmeter & Energy meter; Measurements of Voltage; current; Resistance; Inductance ; Capacitance; Power and Energy.

Magnetic Field & force on Current: Coulomb's law; Magnetic field and field strength; Magnetic force on current; Directions of current and field; Maxwell's screw rule; Fleming's left hand rule; Magnetic field near long wire; Magnetic field in----; Fleming's right hand rule.

Magnetic properties of matter: Poles and dipoles; Coulomb's law for magnets & Gauss's theorem of magnetism; Dia-magnetism; Para-magnetism; Ferro-magnetism; Magneto motive force and field intensity; Concept of self and mutual inductance; The co-efficient of magnetic coupling; Rise of current and decay of current in inductive circuit;

Energy in magnetic field; Inductance in series and parallel; Hysteresis and eddy current losses.

Reference Books:

01. David Halliday and Robert Resin, **Physics Part-II**
02. Boylested, **Introductory Circuit Analysis**
03. B.L. Theraja, **A Text book of Electrical Technology**

CSE-115 Differential Calculus and Co-Ordinate Geometry

3 hours in a week, 3.00 Cr.

Differential Calculus: Limits, continuity and differentiability; Successive differentiation of various types of functions; Leivniz's theorem; Rolle's theorem; Mean value theorem in finite and infinite forms; Lagrange's form of remainders; Cauchy's form of remainders; Expansion of functions; Evaluation indeterminate forms by L'Hospitals rule; Partial differentiation; Euler's theorem; Tangent and Normal , Sub-tangent and sub-normal in Cartesian and polar co-ordinates; Maximum and minimum values of functions of single variable; Points of inflexion; Curvature; Radius of curvature; Centre of curvature Asymptotes, curve tracing.

Co-ordinate Geometry: Transformation of co-ordinates axes and it uses; Equation of conics and its reduction to standard forms; Pair of straight lines; Homogeneous equations of second degrees; Angle between a pair of straight lines; Pair of lines joining the origin to the point of intersection of two given curves; Circles; System of circles; Orthogonal circles; radical axis, radical centre, properties of radical axes; Coaxial circles and limiting points; Equations of parabola; Ellipse and hyperbola in Cartesian and polar co-ordinates; Tangents and normals; pair of tangents; Chord of contact; Chord in terms of its middle points; Pole and polar parametric co-ordinates; diameters; Conjugate diameters and their properties; Director circles and asymptotes.

Reference Books:

01. Dr. Abdul Matin, **Differential Calculus.**
02. Abu Yusuf, Differential Calculus and Integral Calculus.
03. B.C Das& B.N. Mukherjee, **Differential Calculus.**
04. A textbook of Co-ordinate Geometry(Two and three dimensions)
05. Rahman and Bhattacharja, **Co-ordinate Geometry and Vector Analysis.**

GED-116 English

3 hours in a week, 3.00 Cr.

The works should concentrate at the higher levels on technical and IT usage to include:

Accuracy and conciseness in technical English structure, format, etc for technical reports and theses comparing and contrasting aspects of short reports (such as for assignments) and long dissertations (such as for projects).

01. READING AND COMPREHENSION:

Thematic structures, vocabulary, cohesive and rhetorical devices, grammatical items, intension / attitude of the writer, précis (i) comprehension; (ii) paragraph; (iii) precise; (iv) essay; (v) amplification; (vi) dialogue writing.

02. STRUCTURES:

The sentence:

A i) **Normal group:** a) Determiners; b) Adverb; c) Adjective; d) Noun-adjective; e) Headword; f) Prepositional phrase; g) infinitive phrase; h) participle phrase; i) appositive.

ii) **Verbal group:** a) The tenses; b) The modal auxiliaries; c) Phrasal verbs.

iii) **Verb modifiers:** a) Adverbials of time; b) Adverbials of place; c) Adverbials of manner; d) Adverbials of duration; completing sentences, correction of sentences, transformation of sentences, combination of sentences, framing of which questions.

G. NOTIONS AND FUNCTIONS:

i) Emotional attitudes. e.g. liking ii) Moral attitudes: apology, regret etc
iii) Suasion (utterance, designed to influence the behavior of other)
iv) Intellectual attitudes. e.g. agreement, disagreement, permission, obligation, etc.
v) Socializing e.g. greeting, farewell, etc.

03. LETTERS:

Application---Request---Enquiries---Quotation---Complaints---Tender---to Newspapers---Formal and Informal--- Advertisements, etc.

04. TRANSLATION:

English to Bangla and Bangla to English.

05. TECHNICAL WRITING:

Writing Projects, Reports and theses.

Reference Books:

01. Chowdhury & Hossain, **Advanced Learner Functional English.**
02. Boocckner, Keith and Brown, Charies P. Oxford English for computing.
03. Thomson & Martin, A practical **English Grammar**.

CSE-121 Data Structure

3 hours in a week, 3.00 Cr.

Introduction Basic: Terminology; Elementary Data Organization; Data Structures; Data Structure Operations; Control Structures; Algorithms; Complexity, Time-Space Tradeoff, Mathematical Notation and function, String Processing: String Operations, word processing, and Pattern Matching Algorithms.

Arrays, Records and Pointers: Linear Arrays; Representation of linear array in memory; traversing linear arrays, Inserting and Deleting; sorting ;(Bubble sort), Searching (linear, binary), Multidimensional Arrays; Pointer Arrays; Record Structures; Matrices.

Linked lists: Representation of Linked lists in memory, Traversing a linked lists, Searching a linked list,insertion,deletion;Header and two way lists.

Stacks, Queues, Recursion: Array Representation of Stacks, Polish Notation; Quicksort, Recursive definition; Towers of Hanol, Implementation of Recursive procedures, Queue Dequeue, Priority Queues.

Trees: Binary Trees; Representing Binary Trees in memory, Traversing Binary Tree, Header Nodes; Threads, binary search trees, Heap tree, heap sort, Huffman's Algorithm.

Graphs: Sequential Representation of Graph: Adjacency Matrix; Path Matrix; Warshall's Algorithm; Linked Representation of Graphs.

***Reference Books*:**

1. Seymour Lipschutz (Schaum's outline series), Data Structure (International Edition).
2. Ellis Horowitz & Sartaj, Data Structure and Algorithm.
3. Robers L Kruse, Data Structure& Programming Design, 2nd ED.

CSE-122 Data Structure Practical

3 hours in a week, 1.5 Cr.

Laboratory works based on CSE-121

Operation on array of character(Single character, substring insertion,deletion,counting,find,etc),Usage of built-in string function declared in STRING.H file, Declaration and use of single/ multiple structure/ record type variables, Searching algorithms (Linear, Binary), Sorting Algorithms (Bubble,insertion,merge,Quick), Usage of pointer variable and memory allocation, Usage of address arithmetic, Usage of call by reference variable, Usage of pointer in structure variables and implementation as link list, Operation on one-way link list(Creation,display,Insertion,deletion,append etc), Declaration and operation on stack(Push, Pop) and queue (Dequeue), Recursive function (Towers Hanoi), Binary tree implementation, Infix, prefix, postfix transformation using array, Traversing techniques

(In-order, preorder, post-order), Calculation of paths and nodes as well as height of a graph and tree, Advanced sorting technique (Heap sort).

CSE-123 Introduction to Electrical Engineering

3 hours in a week, 3.00 Cr.

Ohm's law, Power and Energy: Conductance and conductivity, Ohm's Law, Power, Wattmeter, Efficiency, Energy, Circuits Breaker's, GFCIS and Fuses, Effect of Temperature on resistance

Series Circuits: Introduction, Voltage Sources in Series, Kirchoff's Voltage Law, Resistance in Series, Voltage Divider rule, Voltage regulation

Parallel circuits: Introduction, kirchoff's current law, Current divider rule, Voltage source in parallel, Open and short circuits, Voltmeter

Method of analysis: Source conversion, Maxwell's loop Current method, Mesh Analysis with matrix form, Nodal analysis with voltage source, Nodal analysis with current source

Network theorem: Delta star conversion, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem.

Laws: Ampere's law, Biot-Savart law, Induction and Inductance, Magnetic properties of matter, Inductors and transformers, AC and DC networks, DC and AC powers, Instantaneous and r.m.s value: Current, voltage and power, average power for various combinations of R.L and C circuits, Phasor representation.

***Reference Books*:**

1. Boylested, Introductory Circuit and Analysis
2. B.L. Theraja, A Text book of Electrical Technology
3. David Halliday and Robert Resin, Physics Part-II

CSE-124 Introduction to Electrical Engineering Practical

3 hours in a week, 1.5 Cr.

Laboratory works based on CSE-123

Verification of ohm's law and measurement of Resistivity of a Metallic wore, To verify Kirchoff's Current law and kirchoff's Voltage law, To verify Thevenin's theorem, To verify Norton's theorem, To verify Superposition theorem, To study R-C circuit and to find out the time constant, To study the R-L-C series Resistance circuit.

CSE-125 Integral Calculus and Differential Equation

3 hours in a week, 3.00 Cr.

Indefinite Integral as Inverse of Derivatives: Techniques of integration; Definite integral as limit of a sum; Interpretation as area; Fundamental theorem of integral calculus (for continuous functions); Determination of length and area of plain curve; Volume and surface area of revolution.

Introduction to linear, Non-linear and Inhomogeneous Differential Equations: Solutions of ordinary differential equations; Solutions by the method of variation of parameters and undetermined co-efficient.

Differential Equations: Power series solutions about singular points; Solutions of partial differential equations by the method of separation of variables.

***Reference Books*:**

1. Dr. Abdul Matin, Integral Calculus
2. B.C Das & B.N Mukherjee, Integral Calculus
3. Abu Yusuf, Differential Equations
4. Dr. Abdul Matin, Differential Equations.

CSE-126 Statistics and Probability

3 hours in a week, 3.00 Cr.

Elements of Statistics: Nature and scope of statistics, Nature & representation of statistical data; Attributes and variables; discrete and continuous variables; Method of data collection;

Measures of location: Characteristics of an ideal measure; Arithmetic mean; Geometric mean; Harmonic mean; Median; Mode; Quartiles; Deciles; Percentiles.

Measure of dispersion: Characteristics of an ideal measure: Absolute & Relative measures; Range; Standard deviation; Mean deviation; Quartile deviation; Coefficient of dispersion; Coefficient of variation; Skow noss and kurtosis

Elements of Probability: Meaning and definition of Probability; A priori and a posteriori probability; Basic terminology of probability; Random variables; Probability function; Expectation of sum and products.

Regression and correlation: Relationship between variables; Fitting of regression lines; Simple correlation; Multiple correlation and regression.

Sampling: Sampling Techniques & its role, different types of sampling & its merits & Demerits.

Tests of Significance: Tests of means, Variance, Correlation coefficient and regression coefficient.

Probability Distribution: Binomial Distribution, its uses and properties, Poisson Distribution, its uses and properties, Normal Distribution, its uses and properties.

***Reference Books*:**

1. M. Nurul Islam, An Introduction to Statistics
2. M.G. Mostafa, Methods of Statistics
3. Md. Abdul Aziz, Business Statistics

CSE-127 Discrete Mathematics

3 hours in a week, 3.00 Cr.

Set Theory, Relations, Functions, Graph Theory, Planer Graph and Trees, Direct graphs and Binary Trees, Algebraic Systems, Ordered sets and lattices, Propositional Calculus, Boolean Algebra, Lattices, group theory, cyclic groups, permutation groups, symmetry groups, quotient, homomorphism, Basic structure theory, Prepositional and Predicate logic, Mathematical reasoning and program techniques, Theories with induction, Counting and countability, Graph and trees. Morphisms, Algebraic structure.

***Reference Books*:**

1. K.H. Rosen, Discrete Mathematics and Its Applications, McGraw Hill, 4th ED 2000.
2. O. Nicodemi, Discrete Mathematics CBS,1989
3. J.C, Molluzzo and F. Buckley (Waveland Press, reprinted 1997) ISBN 0-8833-9407

2nd YEAR 1st SEMESTER

CSE-211 Object Oriented Programming

3 hours in a week, 3.00 Cr.

Principles of Object Oriented Programming; Beginning with C++; Tokens; Expressions and Control Structure; Functions in C++; Classes and Objects; Constructors and Destructors; Operator Overloading and Type conversions; Inheritance: Extending classes; Pointers; Virtual Functions and Polymorphism; Managing console I/O operations; Working with Files; Introduction to Java, comparison between Java and C++.

Reference Books:

1. E. Balagurusamy “Object oriented programming with C++”
2. Robert Lafore “Turbo C++”
3. Herbert Schildt “Turbo C++, The complete Reference”
4. Herbert Schildt “Teach Yourself C++”

CSE-212 Object Oriented Programming Language Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-211

Review of C Programming; Use of C++ Editors/ compilers; Basic C++ input and output statements; Functions (Call by Reference, Function Overloading Friend and virtual function, inline function , default arguments etc); Classes and Objects (Built-in and user-defined, private, Public, Protected members); Constructor and Destructor (With multiple constructor); Arrays of objects and within class; Static data members and member functions; Dynamic and copy constructor; Operator overloading(Unary ,binary, string); Different types of inheritance(with access specifies); Virtual base class; Pointers(this, reference,....), Polymorphism, Dynamic binding ; File processing (Create, read, write and update files sequential access and random access file processing); Development of Integrated software using multiple C++ feature ; Some problems on Numerical Analysis(Solution of Linear equation, Iterative method of root finding, Least square curve fitting, etc).

CSE-213 Operating System

3 hours in a week, 3.00 Cr.

Introduction: Definition OS, Mainframe, Desktop systems, Multiprocessor systems, Distributed systems, Clustered systems, Real-time systems, Handheld systems, Computing environments.
OS Structures: System components, OS services, system calls, system programs, system structure, virtual machines, system design and implementation
Processes: Process concept, Process static, Process control block, threads, Process scheduling, operation on processes, cooperating Processes, interprocesses communication, Communication in client-server system, Threads;
CPU scheduling: Basic concepts, CPU-I/O bust cycle , CPU scheduler, preemptive scheduling, dispatcher, scheduling criteria, Scheduling algorithms, multiple-processor scheduling, real-time scheduling, algorithm evaluation, process scheduling models: ex-windows 2000, Linux

Process Synchronization: Background Process Synchronization, critical section problem, semaphore, classical problems of synchronization, critical regions, OS Synchronization, Atomic transaction
Deadlocks: System model , Dead Lock characterization, Methods for handling Deadlock, Deadlock Avoidance, Dead Lock Detection, Recovery from Dead lock
Memory Management: Background: Address binding, Logical vs. physical Address Space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contigious Memory Allocation, Paging, Segmentation, Segmentation with paging.
Virtual Memory : Background of Virtually Memory (VM)
Demand paging, process Creation, Page Replacement: Different Page, Replacement Algorithms, Thrashing: Working Set Model, Page-Fault Frequency
File Concept: File Attributes, File Operations, File Types , File Structure, File Access Methods, Directory Structure, File system mounting, File sharing, File protection
File System Implementation: File System Structure, File System Implementation, Overview, Partitions and Mounting Virtual File systems, Directory Implementation, Allocation Methods, Free-Space Management, Recovery: Consistency Checking, Backup and Restore Long Structure File System.

Reference Books:

1. Silberschatz, Galvin, Peterson, Operating system Concepts, sixth Edition.
2. A.S. Tanenbaum, OS , Prentice Hall
3. P.B. Hausen, OS Concepts,Prentice Hall
4. S.Madnick and J.Donovon,OS, McGraw Hill

CSE-214 Digital Logic Design

3 hours in a week, 3.00 Cr.

Introductory concept, number systems and codes, Boolean algebra, De Morgan's theorems, logic gates and their truth tables, combination logic circuits, karnaugh map method, digital arithmetic, operations and circuits, decoder, encoder, multiplexer, and demultiplexer, Flip flop and related devices, race around problems, Asynchronous and synchronous counters and their applications, MSI logic circuits, interfacing with analog word: D/A converter circuitry, A/D converter circuitry.

Reference Books:

1. Ronald J. Tocci & Neal S. Widmer, Digital Systems Principal and Application
2. R P Jain, Modern Digital Electronics
3. William I, Fletcher, An Engineering Approach to Digital Design

4. M. Morris Mano, Digital Logic and Computer Design

CSE-215 Digital Logic Design Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-214

Minimize and Implementation of Boolean Functions Using Logic Gates, Design Half Adder and Full Adder, Design Half Subtractor and Full Subtractor , Verify the truth Table o S-R, T,D Flip Flop, Verify the Truth Table of J-K, Prepare Different Type Shift Resister and Check Its Operation, Design Synchronous Counter, Design Asynchronous Counter, Design Ripple Counter, Design Johnson and Ring Counter, Verify the Operation of Encoder and Decoder, Verify the Operation of Multiplexer, De-Multiplexer, Verify the Operation of D/A and A/D Converter.

CSE-216 Mathematics for CSE

3 hours in a week, 3.00 Cr.

Theory of Matrices: Types of matrices (Creditary, hermitian , symmetric etc.); Determinant of a square matrix; Equivalence, Adjoint and inverse of a square matrix, Linear equations; The characteristic roots and the characteristic equation of a matrix; Liner transformation. Similarity transformation.
Vector Algebra : Scalars and vectors, equality of vectors; Addition and subtraction of vectors, Multiplication of vectors by scalars; scalar and vector produdct of two vectors and their geometrical interpretations; triple products and multiple products; linear dependence and independence of vectors.
Vector Calculus: Differentiations and integration of vectors together with elementary applications; Definition of line, surface and volume integrals; Gradient, divergence and curl of point functions, various formula, Gauss's theorem, Stock's theorem, Green's theorem.
Fourier analysis: Real and Complex form of Fourier series: Finite transform; Fourier Integral: Fourier transforms and their uses in solving boundary value problems of wave equations.
Lap lace Transform: Definition; Lap lace transforms of some elementary functions; sufficient conditions for existence of Lap lace transforms; Inverse Lap lace transforms; Lap lace transforms of derivatives. The unit step function; Periodic function; Some special theorems on Lap lace transforms; Partial fraction; Solutions of differential equations by Lap lace transforms; Evaluation of important integrals.

***Reference Books*:**

1. Md. Abdur Rahman, Mathematical Methods
2. Matrices, A.R. Vasishtha

3. Khosh Mohammad, Vector analysis.

CSE-217 Electronic Devices and Circuits

3 hours in a week, 3.00 Cr.

Semiconductor Diodes: Semiconductor Materials, Energy levels, Intrinsic Materials –n-Type and p-Type, Semiconductor Diode, Ideal Diode, Diode Equivalent Circuit, Transition and Diffusion Capacitance.
Diode Application: Sinusoidal Inputs: Half Wave Rectification. Full Wave Rectification, Clippers, Clampers, Zener Diode, LED
Bipolar Junction Transistor (BJT): Transistor Construction, Transistor Operation, Common –Base Configuration, Transistor Amplifying Action, Common Emitter Configuration, Common Collector Configuration, Limits of Operation
DC Biasing- BJTs: Operating Point, Fixed Biased Circuit, Voltage-Divider Bias. DC Bias with Voltage Feedback, Miscellaneous Bias Configuration, Bias Stabilization.
Field Effect Transistor (FET): Construction and Characteristics of JEFT, Transfer Characteristics, Depletion Type MOSFET, Enhancement Type MOSFET
FET Biasing: Fixed- Biased Configuration, Self-Bias Configuration, Voltage –Divider Biasing
BJT Transistor Modeling: Amplification in the Ac Domain, The Hybrid Equivalent Model, Graphical Determination of h-parameters
Operational Amplifiers: Differential and Common Mode Operation, Op –amp Basics. Practical Op-amp Circuit, Op-amp Specifications-DC Offset Parameters, Op-amp Specifications Frequency Parameters, Op-amp Unit Specifications
Op-amp Application: Voltage Summing, Voltage Buffer, Instrumentations Circuit, Active Filters
Feedback and Oscillator Circuits: Feedback Concepts, Feedback Connection Type, Practical Feedback Circuit , Feedback Amplifier- Phase and Frequency Consideration, Oscillator Operation , Phase-Shift Oscillator, Wien –Bridge Oscillator, Crystal Oscillator
Other semi-conductor devices: Thermistors, Tunnel diode, LED & GUNN diode, Photo detectors
Integrated Circuits: Integrated circuit technology, Basic monolithic integrated circuits, Epitaxial Growth, Masking and Etching, Diffusion of Impurities , Transistors for monolithic circuits, Monolithic diodes, Integrated resistors, Integrated capacitors and inductors.

***Reference Books*:**

1. Robert Boylestad and Louis Nashelsky, Electronic Device And Circuit Theory, Sixth Edition
2. Albert Paul Malvino, Electronic And Circuits
3. Abraham Bell, Electronic Devices And Circuit

CSE-218 Electronic Devices and Circuits Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-217

I-V Characteristics of diode, Input and Output Characteristics of BJT: Common-Base Configuration(CB), Common Emitter Configuration(CE), Common Collector Configuration(CC), I-V Characteristic of Zener diode.

CSE-219 Basic Accounting

3 hours in a week, 3.00 Cr.

Introduction: Definition of Accounting, its role and functions, various images of Accounting, Users of Accounting information, history of Accounting, generally accepted accounting principles, distinction between Book keeping and Accounting, relationship of Accounting with other disciplines, ethical issues, and the accounting profession.
The Recording Process: Business transactions, steps in the recording process, the accounting equation, the account, the roles of debit and credit, the journal and the ledger, subsidiary ledgers and special journals, the trial balance.
Accounting for Merchandising Operations: Merchandising operations, Merchandising transactions, Recording of merchandising purchases and sales under perpetual and periodic inventory systems.
The Adjustment Process: Accounting period, accrual vs. cash basis of Accounting, revenues (income) and expenses, types of adjusting entries, preparing and posting of closing entries, preparing the adjusted trial balance, preparation of classified income statement and the balance sheet.
Worksheet: Meaning, objects, nature, rules for the preparation of worksheet and preparation of worksheet-8-column and 10-column.
Preparation of Financial Statements: Single and multiple-step income statements, Owner's equity statement, Classified balance sheet, Cash flow statement.
Rectification of Errors: Meaning; Types of Errors; Rectification of errors before preparation of trial balance; after preparation of trial balance; after preparation of financial statements and errors detected in the next accounting year.
Control of Cash: Internal control, controlling cash, the bank checking account, petty cash funds, bank reconciliation statement.
Accounting Information System: Basic concepts, principles of Accounting information systems, developing Accounting system, mechanized accounting systems.

Reference Books:

1. Harman, Edwards and Maher, Accounting A business perspective, Latest edition.
2. Md. Hafiz Uddin, Basic Accounting (English version), Latest edition, The Angel Publications.

2nd YEAR 2nd SEMESTER

CSE- 221 Algorithm Design

3 hours in a week, 3.00 Cr.

Introduction to algorithm: Analysis of algorithm, design of algorithm, mathematical foundation of algorithm, asymptotic notation, summation, recurrence, set etc.
Divide and Conquer: General method, Binary search, Finding the Maximum and Minimum, Quick sort, Selection.
The Greedy Method: General method, Knapsack problem, Minimum cost spanning trees, Single source shortest path.
Dynamic Programming: General method, Multistage Graphs, All pairs shortest path, Single Source shortest path, Knapsack problem, Optimal Binary search trees, Traveling salesperson.
Basic Traversal & Search Techniques: Techniques for binary trees, Technique for graphs.
Backtracking: General method, the 8-Queens problem, Sum of subsets, Graph coloring.
Branch and Bound: the method, 0/1 Knapsack problem, Traveling Salesperson.

Reference Books:

1. Fundamentals of Computer Algorithm, Sartaj Sahni.
2. How to solve it by computer, R.G.Dromey.
3. Data Structure & Programming Design, Robert L.kruse.

CSE-222 Algorithm Design practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-221

Divide and Conquer: Binary search, Finding the Maximum and Minimum.
Performance measurement using time function: Quick sort and Marge sort, Marge sort bubble sort, Quick sort and heap sort.
The Greedy Method: Knapsack problem, Minimum cost spanning trees, Prims algorithm, Single source shortest path
Dynamic Programming: All pairs shortest path, Knapsack problem, The traveling salesperson.
Backtracking: General method, The 8-Queens problem, Graph coloring Problem.

CSE-223 Database Management System

3 hours in a week, 3.00 Cr.

Introduction: Database system concept, Purpose of Database system, View of data, Data abstraction, Data models, Relational model, Network model, Hierarchical model, Database language, DDL, DML, conventional file processing, Transaction management, Storage management, Database administration, Database users, Overall system structure.

(1)

Database model: Entity-Relationship model Attributes. Mapping Cardinalities, Existence Dependencies, Weak entity set & Strong entity set, Relational model and its language (Relational algebra and SQL).

Database Design: Decomposition, Normalization, Object-oriented Database, Centralized system, Distributed Database, Data fragmentation, Parallel Database.

Integrity Constraints: Domain constraints, Referential constraints, Functional dependencies.

Indexing: Basic concept, Ordered index, Primary index, Dense index and sparse index, Multilevel index, Secondary index.

Reference Books:

1. **Database system concept (4th Edition-Abrahum Silberschatz Henry F.Korth S.Sundarshan)**

CSE-224 Database Management System Practical

3 hours in a week, 1.5 Cr.

Laboratory works based on CSE-223

Design and Create database, Insert/Delete records in each table. Design MASTER FORM with menus, Do the different queries, Report design, Different PL/SQL problems.

CSE-225 Computer Organization and Architecture

3 hours in a week, 3.00 Cr.

Introduction: Organization and architecture, Instruction sets-formats, cycle, timing etc: Addressing mode, Types of Instruction, RISC characteristics, CISC characteristics.

Computer system: System Buses, Components, Functions, Bus interconnection.

Computer Arithmetic: Different types of data representation, Addition and Subtraction, Multiplication Algorithm, Division Algorithm.
Memory Organization: Main memory, Auxiliary memory, Associative memory, Cache memory, virtual memory, Memory management requirements and hardware.
Input-Output Organization: Input-Output Interface, data transfer, Interrupts, Direct memory access (DMA), Input-Output channel.
Central Processing Unit (CPU): Control Unit Operation, Micro-Operation, Control of processor, Hardwired implementation.
Fundamentals of Parallel Processing: Parallel processing, pipelining, Vector processing, Multiprocessor, Array processor, Bit-slice processor Interconnection structure.

Reference Books:

1. **William stallings, computer Organization and Architecture.**
2. **V. Hamcher, Z. Vranesic and S.Zaky, Computer Organization.**
3. **J. P Hayes, computer Architecture and Organization.**
4. **Dr. M. Rafiquzzaman Fundamentals of Computer System Architecture.**

CSE-226 Data Communications

3 hours in a week, 3.00 Cr.

Introduction: Data communication networks standards, Communication architecture and protocol.
Data Transmission: Analog and digital data, Spectrum and Bandwidth, Transmission impairments, Channel capacity, transmission media, Coaxial cable, twisted pair, Fiber optics, Wireless transmission, Electromagnetic spectrum, Radio, Microwave, infra red, Cellular and satellite.
Data Encoding: Digital data digital signaling, NRZI, NRZI, Bipolar AMI, Manchester and differential Manchester encoding, Digital data and analog signaling, ASK, FSK, PSK &QPSK and their performance, Analog data and digital signaling, PCM.
Data communication Techniques: Asynchronous and synchronous transmission, CRC Method, RS232 (or EIA 232D), V2.4 interface standard.
Data Link Control: Flow control, Error detection- parity and CRC, Error control (Stop and wait, Go back NARQ, Selective Reject ARQ), HDLC, Other data link control protocols.
Multiplexing: Frequency division Multiplexing, synchronous time division, Multiplexing, Statistical time division Multiplexing.
Circuit Switching & Packet Switching: Space division and Time division Multiplexing, Switching networks, Circuit switching networks, Circuit switching concepts, Packet switching principle, Virtual circuit, datagram.

Reference Books:

1. **Bchrouz A. Forouzan, Data Communication and Networking.**
2. **W Stallings, Data and Computer Communication.**

GED-227 Economics

3 hours in a week, 3.00 Cr.

Introduction: Definition, Micro economics, Positive Vs normative economics, the basics problems of economic organization, Production possibility frontier.

Supply and Demand: Concepts of supply and demand and determinants, Markets equilibrium and shifts of market equilibrium, Concepts and measurements of various elasticitis of demand and supply.

The Theory of Consumer Behavior: Utility-total and marginal utility, Cardinal & Ordinal utility, Law of diminishing marginal utility.

Theory of Production: Production function, Fixed Vs Variable factors of production, Short run and long run, Total average and marginal product, The law of diminishing returns, Returns to scale, Technological change.

Theory of Cost and Revenues: Short and Long run cost function, Implicit and opportunity cost, Fixed and variable cost, Total average and marginal cost, Envelope curves, Marginal product and least cost rule, Profit maximizing condition.

Market: Perfect competition and monopoly, Short and Long run equilibrium of firm and industry, Profit maximizing, Shut down condition, Resource allocation and economic efficiency.

Macro Economic Overview: Fundamental concepts of macroeconomics, Aggregate demand and aggregate supply.

National Income Accounting: Circular flow of income, Different concept of national income-GNP, GDP, NNP, NI at factor price, Market price and constant price, Personal income, Disposable income, Real and nominal GDP, Net economics welfare (NEW), The CPI & the GDP Deflator, The methods and problems of computing national income.

Consumption and Saving Function: Concepts of MPC, APC, MPS, APS, Short run and long run view-Kuznet's puzzle.

Investment Function: Determinates of investment, Concept of MEC, Present value theorem.

The Classical and Keynesian Theory: Determination of income and employment, Inflationary and deflationary gaps and measures to bridge the gap, Theory of multiplier and accelerator.

Reference Books:

1) **Samuelson & nordhaus, W : Economics.**
2) **Leftwitch : The price system & Resurce Allocation.**
3) **Bilsa : Microeconomics theory.**
4) **Koutsoyiannis : Modern Micro-economics.**
5) **Dornburg & Mc Dougall : Macro-economics.**
6) **Swenburg & Mc Dougall : Macro-economics.**

7) **Domwnick Salvatory : Micro-economics.**
8) **Eugene Diulio : Macro-economics.**

3RD YEAR 1ST SEMESTER

CSE-311 Theory of Computation

3 hours in a week, 3.00 Cr.

Language theory; Finite automata; deterministic finite automata nondeterministic finite automata, equivalence and conversion of deterministic and nondeterministic finite automata, pushdown automata; context free language; context free grammars; Turing Machines; basic machines, configuration, computing with turning machine; Undecidability.

Reference Book:

1. **Hopcroft and Uiiman, introduction to Automata theory, Language and Computations.**
2. **Adamek, Automata and Algebras.**

CSE-312 Microprocessor and Assembly Language

3 hours in a week, 3.00 Cr.

Microprocessors:- Evolution of microprocessors, register base and accumulator based microprocessor, programmable logic devices; main memory array design, memory management concepts, input/output techniques, internal architecture of microprocessor: 8085, 8086, addressing mode, instruction format, instruction set, pin configuration and function, maximum/minimum mode, read/write cycle, memory bank, interrupt and interrupt handling, interrupt controller, DMA.
Advanced microprocessors:- Internal architecture, memory management; protection, an overview of Intel 80 1 86, 80286, 80386, 80486, Pentium microprocessors, RISC processor, coprocessor, Alpha processor.
Assembly Language:- programming with 8086 instruction, conditional and unconditional jump, string instruction, stacks operation, procedure, reentrant and recursive procedure, macro.

Reference Book:

1. D. V Hall, microprocessors and interfacing. McGro-hill, 1987
2. M.Rafiquzzaman, Microprocessors and Microprocessor based system design
3. Y.Liu and G.A. Ginson, Micomputer system: 8086/8088 family

CSE-313 Assembly Language Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-312

Display message (n) times in different line; simple arithmetic operation; Convert a lowercase letter to an uppercase latter and vice versa; Display all alphabet characters;
Input two number, compare them and display the smaller one and vice versa; accept a string from keyboard and display the string in reverse order; Find the largest element from an array and vice versa; perform bubble sort; display first ten numbers by Fibonacci series; calculate sum and average of few numbers; Convert hexadecimal number to binary equivalent; If a character is "Y", Display it, otherwise terminate; calculate the following expression=M+N-P+1 (Using Subroutine); Calculate following operation: if x>y then (M/N)+P else (M-N)*P; (IF-ELSE Statement).

Reference Book:

1. Assembly Language Programming, Marut
2. Assembly Language Programming, Richard C. Detmer
3. Assembly Language Programming, Vanugopal
4. Techniques for the IBM PC. Alan R. Miller

CSE-314 Engineering Mathematics

3 hours in a week, 3.00 Cr.

Series Solution of Differential Equation: Power series method, theory of power series method, Legendre's equation, polynomials, Bessel's functions. Strum – Liouville problems, Orthogonal function, Orthogonal Eigenfunction Expretions.
Complex number and function:- Complex numbers, complex plane, Poler form of complex number, powers and roots, Derivative Analytic function, Cauchy- Riemann equation. Geometry of analytical function; Conformal mapping, Exponential function, Trigonometric function, Hyperbolic function, Liner fractional transformational.
Complex Integration:- Line integral in the complex plane, Cauchy's integral theorem, Cauchy;s integral formula, derivatives of analytical functions.
Power series, Taylor series:- Sequence, Convergence test, power series, function given by power series, Taylor series and maclaurin series, uniform convergence, optional.
Laurent Series, Residue Integration:- Laurent series, singularities and Zeros, Infinity, Residue Integration method, Evaluation of real integrals.

Reference Book:

1. Erwin Kreyszig, Advanced Engineering Mathmatics.

CSE-315 Sociology

3 hours in a week, 3.00 Cr.

Sociological perspective:- Definition, nature, scope and importance of sociology.

Sociology and Scientific Approaches:- Method of social research, stages of social research, primary concept of sociology, society, community, association, institution, group.
Social Evaluation:- Stage in the evolution of human civilization.
Culture:- Definition, characteristics, culture content (material and non-material), cultural lag, culture and civilization.
Industrial Revolution: The growth of capitalism, feature and social consequences, socialism.
Social Organization: Family, forms and function of family, function of family in modern industrial society, marriage, forms of marriage, function of marriage.
Social Stratification: main types of social stratification- slavery-caste and social class and status, social stratification and social mobility.
Social Control: Religion and morality, custom and public opinion, taboo-low, state and education.
Social change: Change evolution-progress-development, factors in social change.
Society and population: Human migration, population and resources.
Some current social problem: Crime, deviance, juvenile, delinquency, youth unrest.
Technology and society: Effects of technological factors on social life.

Reference Book:

1) Metta Spencer and Alex Inkless, Foundation of modern society.
2) Young, P, V Scientific social survey and researce.
3) Ogburn and Nimkoff, A Hand book of sociology.
4) Fairrchild Little Field, Henry Pratt- Dictionary of Sociology and related sciences.
5) Giddings F. H Element of sociology.

GED-316 Technical Writing & Communications

3 hours in a week, 3.00 Cr.

Communication in the workplace: Definition, Scope, Role, Principle, Function, and Objective.
The processes of human communication: Definition, Steps, Feedback.
Adaptation and the selection of words: The basic need for adaptation, Suggestion for selecting words, suggestion for nondiscriminatory writing.
Construction of clear sentence and paragraph: The basic need for adaptation, Suggestion for selecting words, suggestion for nondiscriminatory writing.
Writing for effect: Business etiquette and the need for effect conversational style, you-viewpoint, accent on positive language courtesy, the role of emphasis, coherence.
Directness in Good news: The process of writing, Routine Inquiries.
Indirectness in Bad– News Message: Situation report indirectness, Refused request, Adjustment refusal, other indirect messages.
Strategic in the job search process: The job search, Preparing the application documents, Construction the traditional resume, Constructing the electronic resume, Writing the application letter, Handling the interview.

Modern device in communication/ Electronic communication/ Technology in modern communication: Meaning, Media, Advantage, Disadvantage, Internet, E-mail, Teleconferencing, Multimedia.
Basic of Report writing: Definition report, Determining the report purpose, Determining the factors, Gathering the information needed, interpreting the findings, Organization the report information, Writing the report, Collaborative report writing.
Long, Formal report: Organization and content of the longer report, the prefatory parts, The report proper, Structural coherence helper.

Reference Book:

1) Lesiker, Pettit, Flatley, Business Communication.
2) Betty & key, Business communication system and application.
3) Raymond V. Lesiker, Bain computer.

3rd YEAR 2nd SEMESTER

CSE-321 Software Engineering

3 hours in a week, 3.00 Cr.

Software Engineering Paradigms: Definition of S/W, The classical life cycle, Prototyping fourth generation technique, The product and the process model, General view of software engineering, Boehm's spiral model, Measurement and Matrices.
Requirements Analysis Fundamentals: Analysis principle, Feasibility study, Software prototyping specification, Requirement analysis methodologies, Structured and object oriented analysis, Data flow oriented analysis methods.
Software Design Fundamentals : Design process, Design fundamentals, S/W architecture, Program structure, Data structure, S/W procedure, Modularity, Abstraction, Effective modular design, Procedural design, Data flow oriented design, Top-down and bottom –up design, Design process considerations, Transform analysis, Transaction analysis, Data structure oriented design, Logic construction of programs and systems, Data structured systems development, Object oriented design, Design concepts, Methods, Strategy, Real time design, Coding style, Code document, Data declaration, Statement construction, Input/output, Software reliability.
Software Testing Techniques and Strategies: Software testing method, Testing fundamentals & strategies, White box testing, Basis path testing, Loop testing, Black box testing, Verification and validation, Organization for software testing, Defect testing, Integration testing, Validation testing, System testing, The art of debugging.
Software Management and Maintenance Technique: Maintenance process, System documentation, Maintenance cost, Configuration management & planning, Change management, Person & release management, Software cost estimation technique, Algorithmic cost modeling, The COCOMO model, Software quality assurance &

activities, McCall's quality factor, Software reuse, Software re-engineering, Computer Aided Software Engineering (CASE) tool.

Reference Books:

01. Software Engineering by Lan Sommerville.
02. Software Engineering by Roger S. Presssman.
03. Software Engineering by Martin L. Shoman.

CSE-322 Software Engineering Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-321

A student has to perform one of the following computer based systems: Student information system, Admission processing system, Employee information system, Payroll management system, Result processing system, Library management system.

It is further mentioned that a student can propose any other system, which is relevant with this subject/field.

CSE-323 Numerical Analysis

3 hours in a week, 3.00 Cr.

Numerical solution of polynomials: General algebraic equation, integration.
Numerical solution of simultaneous linear equation: Matrix operations, least-squares curve flitting techniques, interpolation polynomials.
Numerical solution of ordinary differential equation: Euler method, Multi-step methods, Adams-Moulton, Adams-Bash forth method, Predictor-corrector scheme, Runge-kutta methods, Stiffness, Error estimation and step size control, Detailed error analysis of several techniques, Root finding for non-linear equations, Numerical methods for initial value problems for ordinary differential equations.
Direct methods for systems of linear equations: Gaussian Elimination interpreted as matrix factorization, Pivoting strategies, techniques for special classes of matrices.
Iterative techniques for systems of linear equations: Jacobi and Gauss-Scidel iteration, their analysis via matrix and vector norms, the spectral radius of a matrix Eigenvalue problems for matrices illustrative programming projects and use of computer to implement the projects.

Reference Books:

01. J.H.Mathews, Numerical Methods for Computer Science, Engineering and Mathematics, Prentice-Hall, 1987.

02. B.Irons and N.G. Shrive, Numerical Methods in Engineering and Applies Science, Ellis Harwood, 1987.
03. I. Jacques and C.Judd, Numerical Analysis, Chapman and Hall, 1987.
04. M.J.Marron, Numerical Analysis: A practical approach, Macmillan, 1987.

CSE-324 Computer Graphics and Multimedia

3 hours in a week, 3.00 Cr.

Graphics Input, Storage Output and Communications: Graphics input, storage, communication devices, common display devices, raster scan CRT.
Scan Conversion: Scan converting a point, Line, Circle, Ellipse, Areas, Rectangle, Region filling, Side effects of scan conversion.
Two dimensional and Three dimensional Graphics Transformation: Geometric Transformations, Co-ordinate Transformations, Composite Transformations, and instance Transformations.
Two dimensional and three dimensional Viewing and Clipping: Viewing Transformations, Clipping Algorithms.
Mathematics of Projection: Perspective projection, Parallel projection.
Geometric representations: Wire frame model, Curve design, Interpolation and Approximation.
Hidden Surfaces: Depth comparisons, Z-Buffer algorithm, The Painter's algorithm, Scan line algorithm.
Introduction to Multimedia Systems: Interactive and non-interactive multimedia, temporal media and non-temporal media, Hypertext, Hypermedia, MPC Level -1, MPC Level -2, Quick time.
Image: Image, Types and applications, Image Capture, Text conversion, Vectorization, Image compression, Encoding, Standards for encoding images, JPEG.
Audio: Audio capture, Compression methods, MIDI, Digital audio, Sampling rate, Sampling size, MPEG-1, MPEG-2.
Video: TV screen, Monitor, Video capturing technique, Broadcast TV standards, Video standards, Video compression, Coding of real time video, Analog video signal formats, Animation classification and techniques.
Storage for multimedia: Choice of storage, Storage types, Compact disk specification, CD-DA, CD-ROM, CD-I.
Multimedia Project: Project Design concept, Media content design and Development, Interface design and Development process, Multimedia team.

Reference Books:

01. Computer graphics, Schum's Outlines series.
02. Computer graphics principal and practice, Foley, Vandam.
03. Computer graphics: a programming approach, Steven and Harrington.
04. Multimedia in Practice, Judith Jeffcoate.

05. Multimedia Magic, S.Gokul.
06. Multimedia Programming Objects, Environments and framework, Simon J.Gibbs.
07. Multimedia Computers and Communications, N.Sessagiri and Aram Akopov.
08. Open GL® 1, 2 Programming Guide, Mason woo, Jakie Neider, Tom David, Dave Shiner.

CSE-325 Computer Graphics and Multimedia Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-324

Scan Convention Lines, Scan converting Circles, Scan Converting Ellipse, Filling Rectangles, Filling Polygons, Filling Ellipse Areas, Pattern Filling, Clipping Lines, Clipping Circles and Ellipses, Clipping Polygons 2D Transformation, the window to View port Transformation.
Computer Graphics Programming: Open GL.

CSE-326 Compiler Design

3 hours in a week, 3.00 Cr.

Introduction to compiler: Compiler, Analysis of the source Program, the phases of compiler, of the compiler, compiler construction tools.
A simple one pass compiler: Syntax definition, CFG, parse tree, ambiguity, associatively of operators, lexical analysis.
Lexical analysis: the role of the lexical analyzer, input buffering, specification tokens, finite automaton, Thompson's construction, conversion of regular expression to DFA.
Basic parsing technique: Parser Bottom-up parsing, operator precedence parsing, operator precedence grammar, Top down parsing, Predictive parsing, LLI grammar, I.R parser (SLR.LALR).
Syntax Directed Translation: Syntax Directed Definition, Construction of Syntax tree L-Attributed definition.
Run-time Environment: Activation tree, Storage organization, Storage allocation strategies, parameter passing, symbol table.
Intermediate code generation: Intermediate languages, three address code, Boolean expression, back patching.
Code generation: Issues in the design of a code generator. Target machine, basic block flow graph, code generator algorithm, DAG, peephole optimization.
Code optimization: Function preserving optimization, optimization of basic block loop optimization.
Error detection: Reporting errors, Sources of error, syntactic error, semantic error, dynamic error, plan of error diction.

Reference Books:

01. Alfred V.Aho, Ravi Sethi, Jeffery D.Ullman, Compilers. Techniques and tools.
02. Alfred V.Aho, Jeffery D.Ullman, Principles of Compiler Design.
03. A.J Holub, Compiler Design in C.

CSE-327 Compiler Design Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-326

Lex specification to recognize the following verb: am, is, are, was, were, be, being, been, do, does, did, will, would, should, can, could, have, has, had, go.
Lex specification to recognize the following words as different parts of speech: is, am, are, were, go, very, simply, quickly, gently, to, from, behind, between, if, then.
Lex specification to recognize different keyword, Lex specification to recognize the identifier, Lex specification to recognize real numbers, Lex specification to recognize integer, Lex specification to recognize float, Lex specification to recognize for the positive and negative integer and float number, Lex specification to recognize different punctuation symbol, Lex specification to recognize digit, Lex specification to eat up comments, Lex program to find out user name, Lex program to recognize different types of operator, Checking the validity of an arithmetic expression using CFG. Converting Regular Grammar into Regular expression, parsing any string using a CFG.

CSE-328 System Analysis and Design

3 hours in a week, 3.00 Cr.

The systems Development Environment: Introduction – A modern approach to systems analysis and design, year role and other organizational responsibilities in systems development types of information systems and systems development, Developing information systems and the systems development life cycle.
Succeeding as a systems analyst, acquiring the techniques of the systems analyst, automated tools for systems development prototyping, reusable code CASE tools, Visual and emerging development tools-object oriented development tools, visual development tools, evolution and future of development tools.
Analysis: Fundamental principles of systems analysis, the preliminary investigation phase, determining systems requirements, traditional methods for determining requirements, modern methods for determining systems requirements, feasibility study, structuring system requirements- process modeling, data flow diagramming, logic

modeling with structured English, decision trees, Decision tables, Data dictionary , Process descriptions, conceptual data modeling.
The design phase: the logical representation of data, design of physical files and database, design principles and output design, input design, designing forms and reports, designing database, designing the internals-Program and process, Designing distributed systems.

System Development and Implementation: Program and process design, Verification and validation, methods of errors checking a testing, installation-Direct, parallel single location, phased and planning.
System maintenance: Documentation, maintenance information system, the process of maintaining information systems, the process of maintaining information systems, Types of maintenance, managing maintenance, documentation the system-user document, Programmer document and operational document.

Reference Books:

01. Modern systems analysis & design. Jeffrey A. Hoffer etc all, Pearson education Asia, 3rd edition, 2001.
02. Systems Analysis and Design, Shin Yen Wu, West Publishing Company, 1994.
03. Information System: A Management Perspective, 2nd Edition Steven A Benjamin/Cummings, 1996.
04. Information Systems: Theory and Practice, 5th Edition, J Burch and G Grundnitski (John Wiley and Sons, 1989).

4th YEAR 1st SEMESTER

CSE-411 Computer Network

3 hours in a week, 3.00 Cr.

Introduction: Basic computer network concept; Network structure; Network software; Reference model; Example network; OSI Model, TCP/IP Model, X.25 Network.
Frame Relay: Introduction to frame relay, Advantages and disadvantages, role of frame relay, frame relay operations, virtual circuits, DLCIs inside the network, frame relay layers; physical layer, data link layer.
ATM Network: Packet networks, mixed network traffic, cell networks, asynchronous TDM, virtual connection, identifiers, cell, connection establishment and release,

Application Adoptions Layer(AAL), ATM layers, Physical layer, ATM WANs, ATM LANs.
Medium Access sub-layer: Multiple Access Protocols: ALOHA; CSMA/CD Protocol; Collision-Free protocols; CDMA Limited connection protocol; Wavelength division multiple access protocols; Wireless LANs, Mobile telephony and Satellite Networks.
Network Layer: Network layer design issues; Routing algorithms; Congestion control Algorithms; Inter networking; Network layer in the internet; IPv4 and introduction to IPv6.
Transport Layer: The transport service; Elements of transport protocols; The internet transport protocols; The ATM AAL layer protocols;
Optical Fiber Network: SONET and SDH.
Application Layer: Network security; DNS-Domain Name system; SNMP; Simple Network Management protocol; Electronic Mail; The World Wide Web; Multimedia.

Reference Books:

01. Tannenbaum, Computer Networks.
02. W.Stallings, Data & Computer Communication.
03. Behrouz & Forouzen, Data Communication & Networking.

CSE-412 Computer Network Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-411

Overall Concept about network, Configure TCP/IP, Different protocol and net card, DHCP server/client configuration, Introduction to DNS, DNS server configuration, use of DNS testing utility, Caching only DNS server configuration, canonical name implementation, Introduction to electronic mail system configuration, configure to ISP online mail, configure SMTP, POP, testing and debugging, e-mail account splitting, virtual hasting, IMP and POP setup, WINS configuration, apache web server

configuration, apache core active and apache module, web based mail configuration, apache core active and apache module, web based mail configuration using open web mail, IP based virtual web hosting, name based virtual web hosting , testing and debugging and log file analysis , squid proxy server configuration, understanding of different squid tag FTP configuration.

CSE-413 Artificial Intelligence and Neural Network

3 hours in a week, 3.00 Cr.

Introduction: What is AI, Intelligence agents.

Problem Solving by Searching: Blind search, Informed search, Depth first, breadth first, depth limited, Iterative deepening, bi-directional, best first, heuristics search, A search, Hill climbing search, Simulated annealing search, Genetic Algorithm.
Knowledge: Knowledge representation, First-order logic, PL, FOPL, WFFs, Fuzzy Logic.
Neural Network: ANN, Perceptron, Learning, Supervised, Unsupervised, Reinforcement learning, Back Propagation.

Reference Books:

01. Stuart Russel & Peter Norvig, Artificial Intelligence: A Modern Approach.
02. Stamations V Katalopoulos, Understanding Neural Networks and Fuzzy Logic.
03. Barr and Feigenbaum, Handbook of Artificial Intelligence Vol.I, William Kaufmann.
04. Iven Bratko, Programming for Artificial Intelligence.

CSE-414 Parallel and Distributed Processing

3 hours in a week, 3.00 Cr.

Parallel Processing: Overview- Importance, architecture, hardware and software issues. Architecture for parallels processing- classification, comparative study of different architectures, Issues in parallel processing, Parallel Algorithm- Pointer Jumping, Work-efficient, Sorting Networks, Grap Problems- Connected Components, Shortest Paths Spanning Trees.
Distributed Processing: Overview- Definition, impact of distributed processing on organizations, pitfalls in distributed processing, Form of distributed processing- Function distribution, hierarchical distributed systems, horizontal distributed system.
Strategy-strategies for distributed data processing, control of complicity, problem of incompatibility, centralization Vs decentralization, cost a benefit analysis.
Design of distributed data- Distributed data, location of data, multiple copies data, conflict analysis, database management, distributed database and applications.
Fault Tolerance-Forward and Backward Error Recovery, Voting Protocol, Redundancy Approaches, Operation based and State Based Approach, Commit Protocols.

Reference Books:

01. Advanced Computer Architecture- Hwang Kai.
02. Distributed Operating System-P.K. Sinha.
03. Distributed Operating System-Tanenbaum.
04. Algorithm- Coreman.

CSE-415 Peripheral and Interfacing

3 hours in a week, 3.00 Cr.

Interfacing techniques: Interfacing for Memory; Communication system; System overhead(DMA and Programmed data transfer); I/O ports and Control; Parallel and Serial Interfacing devices; Timing considerations; Noise considerations; Application of PPI, PIC, DMAC, PCI etc.

Digital Interfacing: Programmable Parallel ports and handshake input/output(IC 8255), Interfacing a Microprocessor to keyboards, X-lat, Display-Alphanumeric and multiplexed LED (Interfacing with IC 7447), Relay, Stepper motor, Incremental Encoder, Optical motor shaft encoder.

Modern data-entry devices: Scanners overview, Bar code reader, Optical mark reader (OMR), Optical Character Reader (OCR), Tape Reader, Digitizer, Reading technique, Capacitive Electrostatic scanning digitizer.

Display devices: CRT, Basic CRT operations, Timing and frequencies, CRT controller ICs, LCD technologies, Passive and active matrix, LCD reliability, Electroluminescent display.

Printers: Impact printers, Serial and line printing, Laser printing, Ink-jet printing, Color printing, Plotters.

Storage devices: Floppy disk, Floppy disk controller (IC 8272), Magnetic hard disk and controller, Compact disk, Magnetic tape storage.

Data Communication and Network: Introduction to asynchronona serial data communication, RS-232 C serial data standard, USART (IC 8251A) word format, Null Modern configuration, The GPIB, HPIB, IEEE 488 Bus.

Reference Books:

01. Microprocessor and Interfacing by Andrew Hall.
02. Computer Peripheral (Part B) by Barry Wilkinson.

CSE-416 Peripheral and Interfacing Practical

2 hours in a week, 1.0 Cr.

Laboratory works based on CSE-415

Understand SDK 86 board, write and execute a program in an SDK 86.
Understand RS-232 standard, Connections and Cabling.
Communicate between two Computers using parallel ports (printer port).
Observe and manipulate Null modern Configuration.
Communicate between two Computers using serial ports.
Drive a single 7 segment LED display with 7447.
Understand the basic characteristics of IC 8255.

CSE-417 Digital Signal Processing
3 hours in a week, 3.00 Cr.

Introduction to Digital Signal Processing (DSP): Introduction, Digital Signal Processing, Sampling and Analog-to-Digital Conversion, Discrete Time Signals, Ambiguity in Digital Signals, Discrete Time Systems, Application areas for Digital Signal Processing(DSP), Keys of DSP operations, Convolution, Correlation, Digital Filtering, Discrete Transformation, Modulation, System Design, Methodology & Implementation Methodology.
Discrete Fourier Transform: Fourier series, one dimensional Fourier transforms, Discrete Fourier Transform (DFT) and its properties, Fast Fourier Transform (FFT) and its algorithm, Inverse discrete Fourier transformation.
The Z-Transform: Introduction to Z-Transform, General Results of z-transform, Inverse z-transform, Partial Fraction Expansion, Power series Expansion, Contour Integration, Comparison of inverse z-transform method, Properties of z-transform, Complex Convolution Theorem and Parse Val's Relation.
Implementation of Discrete Time Systems: Introduction , Block Diagram and Signal Flow graph Representation of Digital Networks, Matrix Representation of Digital Networks, Basic Structures of IIR Systems , Direct Form, Cascade forms, parallel form, Transposed Forms, Basic Structures of FIR Systems, Finite Precision Effects.

Design of Digital Filters: Introduction to Digital Filters, Types of Digital Filters, FIR and IIR, Choosing between FIR and IIR Filters, Digital Filter Design Steps, Design of FIR Filters, Design of FIR Filters by Windowing, Design of Optimum Equiripple Linear phase FIR Filters, Design of IIR Filters, Classical Continuous Time Low-pass Filter Approximations, Conversion of Transfer Functions from Continuous to Discrete Time, Frequency Transformation of Low pass Filters, Adaptive digital filters , Concepts of adaptive filtering basic wiener filter theory , The basic LMS adaptive algorithm, Recursive least square algorithm.

Reference Books:

01. Emmanuel C. Ifeachor, Barrie W.jervis. Digital Signal Processing.
02. John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing-Principles, Algorithms and applications.
03. Alan V. Oppenheim, Ronald W,Schafer, John R. Buck, Discrete Time Signal Processing.

4th YEAR 2nd SEMESTER

CSE-421 Web Engineering

3 hours in a week, 3.00 Cr.

Introduction to Web application technology, basic concepts, Client Server architecture, Web browser and Web servers, WWW, structure of a website, popular websites and their speciality, basic concepts static and dynamic web sectors, different web problems like Hoaxes, Spy ware, Viruses and Pop-ups etc.
Brief history of Mark-up languages, HTML and introduction to HTML, basic HTML tags, adding links to different pages, inserting images, back ground sounds, GIF, Animations, form and form components, Contact Feed back Forms (Text box, Text fields, Pull down menu, Submit/reset Button, redirection between Web pages.
CSS, basic concepts of CSS, CSS handlers, creating custom text styles using CSS, using/calling CSS functions in forms, changing links.
Introduction to Java scripts, Using Basic Java Scripts functions like write line, time, date etc.
Using Simple scripts on different mouse events, changing page Title, Using Java scripts to design multi-state image links, Pull-down menus, embedding dynamic elements with Java Scripts, advanced custom tags.
Basic Concepts of Java applet, Building simple applets with images, text and links, supported platform and browsers, common problems and trouble shooting, Basic concepts of DHTML, How it uses HTML , Java scripts and CSS components, Texts, links and Image array.
PHP, Supported platforms, basic programming concepts and its dynamism, Simple PHP scripts to write/read inputs in forms and using in Dynamic forms, Integrating PHP and My-SQL, Using PHP Forms to manipulate data in the database, Data Validation, Session, Security, Web application development.

Reference Books:

01. Chris Lea. Wankyu Choi, Allan kent, Ganesh Prasad, Chris Ullman. Beginning Php 4(Programmer to Programmer).
02. Surid Sharkar, CSS/Java Script.
03. Web Design Complete Reference by Thomas A. Powell
04. Creating Web Pages with HTML Simplified
    Sherry Willard Kinkoph
05. Web Design in a Nutshell(O'RELLY)
    Jennifer Niederst

CSE-422 Web Engineering Practical

3 hours in a week, 1.5 Cr.
Laboratory works based on CSE-421

1. Designing a simple HTML Document to show text (Introduction to <HTML>, <Body><Head/Title>, <Meta Content>, Using Different HTML tags to format Body contents.
2. Text alignment in table, Introduction to form elements (textbox, checkbox, combo box, etc) and designing simple Feedback/Contact forms.
3. Using Java Scripts to create web pages containing custom Welcome message (Date-time).
4. Using text Links to navigate between different pages, inserting Images and back ground sounds and using Images as Link.
5. Using page frames and mouse over links and implementing them in a HTML document.
6. Using CSS to apply formatting text, forms, tables and link styles.
10. Using different control statements in Java Scripts to execute simple mathematical expressions (if-else, Switch-case, for, while, do-while).
11. Installing Apache, PHP 4/5 and integrating into windows platform, creating PHP documents with simple tags, installing My-SQL and connection between PHP and My-SQL.
12. Inserting data into My-SQL database using PHP forms.

Project: Design and develop a Complete Dynamic website with HTML, PHP and My-SQL having forms also a flexible navigation menu which has links to all available section on the site.

Cryptography and cryptographic algorithms: Traditional cryptographic algorithms: traditional cryptography, cryptanalysis, Private-key (symmetric-key) and public-key (asymmetric-key) cryptographic algorithms, DES and block cipher modes, advanced encryption standard, RSA and other public key cryptosystems, key management, diffie-Hellman key exchange, Elliptic curve cryptography, cryptography hash functions, secure hash algorithm, message authentication codes, Digital signatures and digital signature standard.

Cryptography and network security: Data-origin authentication and data integrity, Key distribution, management, Kerberos and X.509 authentication service, certificate authority and public key infrastructure, Email security, PGP and S/MIME, IP Security, authentication header and ESP, Security associations, Key management, Web security considerations, secure socket layer and transport layer security, secure electronic transactions (SET).

Cryptography for antivirus software and password management: Generic decryption, digital immune system and UNIX password scheme.

Reference Books:

01. Cryptography and Network Security, William Stallings.
02. Hand book of Applied Cryptography, by A.Menezes, P.van Oorschot, and S.Vanstone, CRC Press, 1996(www.cacr.math.uwaterloo.ca/hac).

CSE-42X Elective Course

3 hours in a week, 3.00 Cr.

This is an elective course the student should choose one of the elective course in consultation with head of the department.

CSE-499 Project Work (Continued from 7th Sem.)

12 hours in a week, 6.00 Cr.

CSE-424 Image Processing

3 hours in a week, 3.00 Cr.

Introduction to image processing: Representation of image, A basic image processing system, Relationship to human visual system, Example of fields that use digital image processing.
Digital Image Fundamentals: Image formation in the eye, Light and electromagnetic spectrum, Image sensing and acquisition, Image sampling, Image quantization, Some basic relationships between pixels Neighbors of a pixel, Adjacency, connectivity, region, Boundaries, Distance measures.
Image enhancement: Some basic gray level transformations, Histogram processing, Histogram equalization, Histogram matching, Image negatives, log transformation, Power law transformation, Basics of spatial filtering, Smoothing spatial filters, Homomorphic filtering, Correspondence between the spatial and frequency domain filtering.
Image Restoration: A model of the image degradation/ Restoration process, Noise models, Restoration in the presence of noise only spatial filtering.
Color Image processing: Color fundamentals, Color models, the RGB color model The CMY, CMYK, color Model, HIS color Model, Basics of full-color transformation, Color transformations, formulation.
Image Compression: Image compression fundamentals, Coding redundancy, Inter pixel redundancy.
Psycho visual redundancy, Image compression models, The source encoder and decoder, the channel encoder and decoder.
Image Segmentation: Edge detection, line detection, point detection, Boundary Detection, Thresholding, Region based segmentation.

Reference Books:

01. Rafael C.Gonzalez, Richard E.Woods, Digital Image Processing.
02. Anil k.Jain, Fundamentals of Digital Image Processing.
03. M A Sid-Ahmed, Image processing theory, Algorithms and architectures.

CSE-425 VLSI Design

3 hours in a week, 3.00 Cr.

VLSI Design: Design and analysis techniques for VLSI circuits, Design of reliable VLSI circuits, Noise consideration, Design and operation of large fan out and fan in circuits, clocking methodologies, techniques for data path and data control design, Simulation techniques, parallel processing, Special purpose architectures in VLSI layout partitioning and placement routing and wiring in VLSI, Reliability aspects of VLSI design, Graph based VLSI Design, Multilevel VLSI circuit, Multiple Valued VLSI circuit.

Reference Books:

01. Basic VLSI Design system and Circuits, Douglas A. Pucknell, KAMRAN Esharaghiam, Pentic, Hall International Inc, Second Edition.
02. Modern VLSI Design by Wayne Wolf.

CSE-426 Simulation and Modeling

3 hours in a week, 3.00 Cr.

Concept of system: System components, continuous and discrete systems.
System modeling: Types of models, static and dynamic models, physical and mathematical models, continuous and discrete models, Principles used in system modeling, Study if system model, system design, system model analysis and postulation.

System Dynamics: Need for simulation, types of simulation, techniques of simulation, Comparison of simulated and analytical methods, Continuous system simulation, Differential equation model.
Exponential growth models and decay models, generalization of growth models, System dynamics diagrams, Multi-sigment models, representation of time delay, Probability concepts in simulation, Stochastle variable, discrete and continuous probability functions, Generations of random numbers, Generating discrete distributions, Non-uniform continuously distributed random numbers, Rejection method.

Discrete System Simulation: Discrete event simulation, activity simulation, representation of time, generation of arrival patterns, entities, resources, queues, Measure of queues and mathematical solution of queuing problems.

Discrete simulation languages: General Purpose simulation, system language (GPSS) and SIMSCRIPT.

Reference Books:

01. System Simulation by Geoffery Grodon, Prentice Hall
02. Discrete-event System Simulation by Banks J and Carson JS, Prentice Hall
03. Simulation Modeling with Pascal, Prentice Hall
04. System Simulation with digital computer, Narsing deo.

CSE-427 E-Commerce

3 hours in a week, 3.00 Cr.

Introduction: An overview, traditional and electronic business transactions, types of e-commerce, benefits of e-commerce.
Security and e-commerce: Review of private key and public key enery operations, Comparison of eneryption method, Digital signatures and certificates, Overview of literate security systems.
Handling money on the net: Transactions on the internet, requirements for payment systems, types and tools for electronics payment, electronic data interchange and components of EDI system.
Consumer and Business Markets: Consumer markets and one to one marketing, value chains and the market place, Online communities and new marketing opportunities, websites and ordering online, Online catalogs, tying database, to online catalogs, Electronic consumer support, tracking online problems, security software modules.
Virtual: Virtual factory, virtual co-ordination and implementation, access to shared data and applications, entrusting access to intermediary.
Business Process Engineering: Approaches, models and methodologies, management of changes.
Legal Issues: Risk associated with proper documents and electronic documents, authentication of electronic documents, laws for e-commerce, EDI interchange agreements legal issues for internet commerce.

Reference Books:

01. E-Commerce, KK Bajaj and D.Nag.
02. E-Commerce, D.Kosiur.
03. Electronic Commerce, P. Loshin, P. Murphy.
04. Frontiers of Electronic Commerce, R. Kalakota.