"Heaven's Light is Our Guide"
Rajshahi University of Engineering & Technology
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROPOSED (Approved by Academic Committee)
SUMMARY OF COURSES FOR UNDERGRADUATE PROGRAM

FIRST SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./Week	Sessional Hrs./Week	Credit.
1.	CSE 100	Computer Fundamentals	0	3/2	0.75
2.	CSE 107	Computer programming	4	0	4.00
3.	CSE 108	Sessional based on CSE 107	0	3	1.50
4.	EE 107	Basic Electrical Engineering	3	0	3.00
5.	EE 108	Sessional based on EE107	0	3	1.50
6.	Ch 107	Chemistry	3	0	3.00
7.	Ch 108	Sessional based on Ch 107	0	3/2	0.75
8.	Math 107	Mathematics-I	3	0	3.00
9.	Hum 107	English	3	0	3.00
		Total=	16	9.00	20.50

1st Semester Load :16L+9.00 P=25.0 Hrs/Week
        :20.50 Credit

SECOND SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./ Week	Sessional Hrs./ Week	Credit.
1.	CSE 200	Drawing and CAD Project	0	3/2	0.75
2.	CSE 201	Data structure	3	0	3.00
3.	CSE 202	Sessional based on CSE 201	0	3	1.50
4.	CSE 207	Object Oriented Programming	3	0	3.00
5.	CSE 208	Sessional based on CSE 207	0	3	1.50
6.	Ph 207	Physics	3	0	3.00
7.	Ph 208	Sessional based on Ph 207	0	3	1.50
8.	Math 207	Mathematics-II	3	0	3.00
9.	Hum 207	Economics, Government & Sociology	4	0	4.00
		Total=	16	10.50	21.25

2nd Semester Load :16L+10.5P=26.5 Hrs/Week
        :21.25 Credit

THIRD SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./Week	Sessional Hrs./Week	Credit.
1.	CSE 300	Software Development Project-I	0	3/2	0.75
2.	CSE 305	Discrete Mathematics	3	0	3.00
3.	CSE 306	Sessional based on CSE 305	0	3	1.50
4.	EE 303	Analog Electronic Circuits	3	0	3.00
5.	EE 304	Sessional based on EE 303	0	3	1.50
6.	Math 307	Mathematics-III	3	0	3.00
7.	CSE 307	Digital Techniques	3	0	3.00
8.	CSE 308	Sessional based on CSE 307	0	3	1.50
9.	Hum 307	Industrial Management & Accountancy	4	0	4.00
		Total=	16	10.50	21.25

3rd Semester Load :16L+10.5 P=26.5 Hrs/Week
                  :21.25 Credit

FOURTH SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./ Week	Sessional Hrs./ Week	Credit.
1.	CSE 401	Algorithms Design & Analysis	3	0	3.00
2.	CSE 402	Sessional based on CSE 401	0	3	1.50
3.	EE 403	Electrical Machines & Applications	3	0	3.00
4.	EE 404	Sessional based on EE-403	0	3	1.50
5.	Math 407	Mathematics-IV	3	0	3.00
6.	CSE 405	Numerical Method	3	0	3.00
7.	CSE 406	Sessional based on CSE 405	0	3	1.50
8.	CSE 407	Finite Automata Theory & Pulse Technique	3	0	3.00
9.	CSE 408	Sessional based on CSE 407	0	3/2	0.75
		Total=	15	10.50	20.25

4th Semester Load :15L+10.5P=25.5 Hrs/Week
                  :20.25 Credit

FIFTH SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./Week	Tutorial Hrs./Week	Sessional Hrs./Week	Credit.
1.	CSE 500	Internet Programming Lab/Project	0	0	3/2	.75
2.	CSE 501	Data Base Systems	4	0	0	4.0
3.	CSE 502	Sessional based on CSE 501	0	0	3	1.5
4.	EE 503	Instrumentation	2	0	0	2
5.	EE 504	Sessional based on EE 503	0	0	3/2	0.75
6.	CSE 503	Software Engineering	3	0	0	3
7.	CSE 505	Applied Statistics & Queuing Theory	3	0	0	3
8.	CSE 507	Microprocessors & Assembly Language	3	0	0	3.0

9.	CSE 508	Sessional based on CSE 507	0	0	3	1.5
		Total=	15	0	9	19.5

5th Semester Load :15L+0T+9 P=24 Hrs/Week
:19.5 Credit

SIXTH SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./ Week	Tutorial Hrs./Week	Sessional Hrs./ Week	Credit.
1.	CSE 600	Software Development Project – II	0	0	3	1.5
2.	CSE 601	Operating System	3	0	0	3.00
3.	CSE 602	Sessional based on CSE 601	0	0	3/2	0.75
4.	CSE 603	Computer Architecture	3	0	0	3
5.	CSE 605	Data Communication	3	0	0	3.00
6.	CSE 606	Sessional based on CSE 605	0	0	3/2	0.75
7.	CSE 607	Peripherals & Interfacings	3	0	0	3.00
8.	CSE 608	Sessional based on CSE 607	0	0	3/2	0.75
9.	CSE 609	Artificial Intelligence & Expert System	3	0	0	3.00
10.	CSE 610	Sessional based on CSE 609	0	0	3/2	0.75
		Total=	15	0	9	19.5

6th Semester Load :15L+0T+9P=24 Hrs/Week
:19.5 Credit

SEVENTH SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./ Week	Sessional Hrs./ Week	Credit.
1.	CSE 700	Project and Theses-I	0	3	1.5
2.	CSE 701	Complier Design	3	0	3.00
3.	CSE 702	Sessional based on CSE 701	0	3/2	0.75
4.	CSE 705	Information System analysis & Design	3	0	3.00
5.	CSE 706	Sessional based on CSE 705	0	3/2	0.75
6.	CSE 707	Computer Network	3	0	3.00
7.	CSE 708	Sessional based on CSE 707	0	3/2	0.75
8.	Optional -I		3	0	3.00
9.		Sessional based on Optional -I	0	3/2	0.75
10.	Optional-II		3	0	3
		Total=	15	9	19.5

6th Semester Load :15L+9P=24 Hrs/Week
:19.5 Credit

List of Optional Courses			
		Course No.	Course Title
Optional-I		CSE 713	Digital Signal Processing
		CSE 721	Unix programming
		CSE 725	Human Computer Interaction
		CSE 727	Digital System Design
		CSE 731	Simulation & Modeling
		CSE 714	Sessional based on CSE 713
		CSE 722	Sessional based on CSE 721
		CSE 726	Sessional based on CSE 725
		CSE 728	Sessional based on CSE 727
		CSE 732	Sessional based on CSE 731
Optional-II		EE 701	Control System Engineering
		CSE 703	VLSI Design
		EE 717	Telecommunication Switching

EIGHTH SEMESTER

SL. No.	Course No.	Course Title	Theory Hrs./ Week	Sessional Hrs./ Week	Credit.
1.	CSE 800	Project and Theses-II	0	3	1.50
2.	CSE 801	Computer Graphics	3	0	3.00
3.	CSE 802	Sessional based on CSE 801	0	3/2	0.75
4.	CSE 809	Neural Networks & Fuzzy Systems	3	0	3.00
5.	CSE 810	Sessional based on CSE 809	0	3/2	0.75
6.	CSE 820	Seminar	0	3/2	0.75
7.	Optional-I		3	0	3.00
8.	Optional-II		3	0	3.00
9.	Optional-III		3	0	3.00
		Total=	15	7.5	18.75

6th Semester Load :15L+7.5P=22.5 Hrs/Week
:18.75 Credit

List of Optional Courses

Optional-I, Optional-II and Optional-III should be selected from the following courses:

Course No.	Course Title
CSE 821	Network Planning
CSE 823	Advanced Computer Architecture
CSE 825	Robotics and Computer Vision
CSE 827	Network Security
CSE 829	Decision Support System
CSE 831	Knowledge Engineering
CSE 833	Digital Image Processing
CSE 835	Parallel and Distributed Processing

DETAILED COURSE CONTENTS

FIRST YEAR FIRST SEMESTER

CSE 100 Computer Fundamentals

Introduction to Computer fundamentals: types and generation of computers, basic organization and functional units. Number systems, codes and logic functions. Hardware: Processors, input, output and memory devices, keyboard, mouse, OMR, OCR, MICR, CD-ROM, Printers, CRT, microfilm, floppy

Machine language , assembly language, High level language, assembler, translator, interpreter and compiler. Types of software, system software, familiarization with various operating systems (Windows, DOS, UNIX etc.). Application software: text processing (MS-WORD, etc), Spread sheet (MS-EXCEL etc), Database management (FoxPro, MS Access, Oracle etc), mathematical and simulation(Math Cad, Matlab etc.) . Data communications and Internet.

CSE 107 Computer Programming

History of Programming Language, Programming Algorithms and Flow Chart Construction. Principles of Programming. Structured Programming Concepts. Writing, Debugging and Running Programs in DOS, Windows and UNIX Environment Using C/C++. Variables, Arithmetic Expression, Types of Operators and Expressions, Control Flow, Functions, Arrays, String, Software Interrupts, DOS & BIOS Service Routines.

Structure, Union, Pointer, Dynamic Memory Allocation, I/O and File Management, VROOMS, Multiple File Programming, Command Line Compilation and Command Line Argument, Basic Sorting Algorithms. Introduction to C/C++ Graphics Library. Introduction to Object oriented programming and its various features.

CSE 108 Sessional based on CSE 107

EE 107 Basic Electrical Engineering

Electrical units and Standards. Electrical circuit elements and models. Signal and waveforms. Fourier representation of non-sinusoidal waveforms. RMS and average value of sinusoidal waveforms. Introduction to phasor algebra. DC& Steady state AC circuit solutions: Series, Parallel, Series-Parallel networks, Loop and Nodal methods, Delta-Wye transformations.
Circuit theorems and their application to circuit solution. Circuit analysis using PSpice

EE 108   Sessional based on EE 107

Ch 107   Chemistry

Aqueous Solution: Types of solution, Factors influencing the solubility of substance. The Lechatclier's principle, Mechanism of dissolution, Evolution and absorption of heat, Different units of concentration, Problems involving acid base titration, Solution of gases in liquids, Distribution of solute between two immiscible solvent, Application of distribution law, properties of dilute solution, Vapor pressure, Raoult's Law - its application, Elevation of boiling point, Depression of freezing point and osmotic pressure. Colloids and properties of colloidal system, Chemical Bond: Different type of chemical bond. Granular properties of ionic and covalent compounds, Modern approach of covalent bond.
Physical Chemistry : Kinetics and Chemical equilibrium: rate of a reaction, Factors determining the rate, Law of mass action, Evaluation and characteristics of equilibrium constant of reaction, **Thermo-chemistry** : Types of energy, Enthalpy, heat of reaction, heat of combustion, Heat of formation and heat of neutralization, Experimental determination of thermal changes during chemical reaction, Electrolytes, Mechanism of electrolytic conduction, Transport number and electrolytic conductance.

Ch 108   Sessional based on Ch 107

Math 107   Mathematics – I

Differential Calculus : Limit, Continuity and differentiability. Differentiation of explicit and implicit function and parametric equations. Significance of derivatives, Differentials, Successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem, Mean value theorems. Taylor's theorem in finite and infinite forms. Maclaurin's theorem in finite and infinite forms.Langrange's form of remainders. Cauehy's form of remainder. Expansion of functions by differentiation and integration. Partial differentiation. Euler's theorem. Tangent, maximum and minimum values of functions and points of inflection. Applications. Evaluation of indeterminate forms by L'Hospitals rule, Curvature, center of curvature and chord of curvature. Evaluate and inviolate. Asymptotes. Envelopes, Curve tracing.

Integral Calculus : Definitions of integration, Integration by method of substitution, Integration by the method of successive reduction. Definite integrals. Beta function and Gamma function. Area under a plane curve in Cartesian and Polar co-ordinates. Area of the region enclosed by two curves in Cartesian and Polar co-ordinates, parametric and pedal equations. Intrinsic equation. Volumes of solids of revolution. Volume of hollow solids of revolution. Volume of hollow solids of revolution by shell method. Area of surface of revolution

Hum 107   English

Grammar: Construction and Transformation of Sentences, Analysis of Sentence, Structure, Use of Preposition, Question Words, WH & Yes/No Question, Phrases & Idioms, Correction, Conditional Sentences, Punctuation, Pronunciation, Phonetic Transcription, Spoken English.
Composition: Definition of Scientific Terms, Comprehension, Précis Writing, Commercial Correspondence, Paragraph Writing, Amplification, Tenders & Schedules, Memos & Press-Release, Report Writing.
Short Stories:
"The Diamond Necklace" – Guy De Mapausant
"Meeting in the Mosque" – E. M. Forster
"Tickets, Please" – D. H. Lawrence
"The Dead" – James Joyce

FIRST YEAR SECOND SEMESTER

CSE 200   Drawing and CAD Project

Introduction. Scale drawing, Sectional view, Isometric views, Missing line, Auxiliary view. Detail and assembly drawing, Project on Engineering Drawing and CAD using AUTOCAD or contemporary packages instructed by the teachers.

CSE 201   Data Structure

Concepts and Examples of Elementary Data Objects, Necessity of Structured Data, Types of Data Structure, Ideas on Linear and Nonlinear Data Structure, *Array:* Linear and Binary Search, Multidimensional Array, Pointer Array, Parallel Array, Sparse Matrices, *Pointer:* Memory Optimization by Dynamic Memory Allocation, Multi-Dimensional Pointers, Function Pointer. *Stack:* Stack Representation, Polish Notation. *Queues:* Queue Representation, Deques, Priority Queues. Recursion, Implementation of Recursion Using Stack and Queues. Various Sorting Algorithms and Complexities, Merging, Analysis of Quick Sort.

Nonlinear Data Structure Concepts. *Linked List:* Memory Representation of a List, Basic Operations, Two-Way, Circular List and Header List. *Binary Search Tree:* Memory Representation of Tree, Basic Operations, Recursive and Non-Recursive Tree Operations, Threading, Heap. Graph: Sequential and Linked Representation of Graph, Shortest Path Algorithm, Breadth and Depth First Search, Concept of Graph Coloring. *Hash Technique:* Purpose of Hashing, Collision Resolution, Chaining.

CSE 202   Sessional based on CSE 201

CSE 207   Object Oriented Programming

Introduction to C++, Basic structure of C++ Programs, Dissimilarities between C and C++, Advanced Data Types, Access Modifiers, Storage Class Specifies, Type Conversion in Assignments, Function Type Modifiers, Dynamic Memory Allocation Using C++. User Defined Data Types, Advanced Operators, Enumerated Data Types. *Object Oriented Programming:* Concepts of Object Oriented Programming, Class and Object, Inheritance, Polymorphism, OPP with C++, Parameterized Constructors, Destructor, Friend Functions, Multiple Inheritance, Passing Object to Functions, Arrays of Objects, Pointer to Objects.

Function and Operator Overloading, Overloading Constructor Functions, References, Multilevel Inheritance, Virtual Functions and Polymorphism, Abstract Class, C++ I/O Libraries, C++ Streams, Creating Inserters and Extractors, Formatting I/O, File I/O, Static Class Members, C++ Complex and BCD Classes, The Message Based Philosophy. Standard Template Libraries. *Java:* Introduction to Java, Java Development Environment, JVM, Advances of Java Over Computer Programming, Byte Codes, Variable, Operator and Data Types, Classes, Threads, Introduction to Applets, Swing and Servelets, Basic Error Handling, Concept of Threading, Execution of Java Programs in UNIX Operating System.

CSE 208   Sessional based on CSE 207

Ph -207   Physics

Waves and Oscillations: Oscillations: Simple harmonic motion, Composition of simple harmonic motions and Lissajous' figures, Damped and Forced oscillations. Resonance. Waves: Travelling and Standing waves, Energy calculation of Travaling and Standing waves, Intensity of waves. Beats, Doppler effect.

Atomic Physics: Atom models: Thomson atom model, Rutherford atom model, Rutherford scattering formula, Electron orbits, Bohr atom model, Energy levels and spectra, Particle properties of waves: Photoelectric effect, Einstein's photoelectric equation, Laws of photoelectric emission, Compton effect, De Broglie waves.

Nuclear Physics: The nucleus, Nuclear constituents, Binding energy, Nuclear reactions, Q-value of a nuclear reaction, Nuclear fission and fusion, Radioactivity: Radioactive decay law, Half-life and Mean life, Law of successive disintegration, Radioactive equilibrium, Alpha decay, Mass energy relation in Alpha decay, Beta decay, Inverse beta decay, Neutrino hypothesis of beta decay, mass condition of beta decay, Gamma decay.

Relativity: Michelson-Morley experiment, Special theory of relativity, Lorentz transformations, Length contraction, Velocity addition and Time dilation, Relativity of mass, Mass-energy equivalence. Massless particle.

Quantum Effect: de Broglie waves, Group velocity, Phase velocity, ,

Ph 208   Sessional based on ph 207

Math 207   Mathematics - II

Co-ordinate Geometry: Co-ordinate Geometry of two dimensions: Change of axes, Transformation of co-ordinates, simplification of equations of curves, Co-ordinate Geometry of three dimensions: System of co- ordinates, distance of two points, Section formula, projection, direction cosines, Equations of planes and lines.

Ordinary Differential Equation: Degree and order of ordinary differential equations. Formation of differential equations. Solutions of first order differential equations by various methods, Solutions of general linear equations of second and higher orders with constant coefficients, Solution of homogeneous linear equations. Solution of differential equations of the higher order when the dependent of independent variables are absent.

Hum 207   Economics, Government & Sociology

Economics: Nature of the economics theory applicability of economic theory to the problems of developing countries, Some basic concepts - supply, demand and their elasticity, relationship among average, margin and total and their derivation. Consumer's equilibrium-indifference curve, producer's equilibrium-isoquant. Production - factors of production, production possibility curve-equilibrium of a firm, fixed cost and variable cost, the short run and the long run. Laws of returns and external economics and diseconomics. Economics of development and planning basic concept-saving, investment, GNP, NNP, per-capita income, growth rate, Fiscal policy, monetary policy and trade policy and their relative applicability in Bangladesh, Five year plans of Bangladesh, development problems related to agriculture, industry and population of Bangladesh.

Government: Basic concepts of government and politics. Functions, Organs and forms of modern state and Government, Socialism. Capitalism, UNO, government and politics of Bangladesh, Some major administrative systems of developed counties. Local self - government.
Sociology: Scope, Social evolution and techniques of production, Culture and civilization, Social structure of Bangladesh, Population and world resources. Industrial revolution. Family - Urbanization and industrialization, Urban Ecology, Co-operative and socialist movements, Social crime and delinquency.

SECOND YEAR THIRD SEMESTER

CSE 300 Software Development Project – I

Students will develop three programs / projects with proper documentation as assigned by teacher and will run on micro / mainframe computers.

CSE 305 Discrete Mathematics

Sets and its operations, Relations: relations and their properties, n-ary relations, Partial Ordering, lattice. Logic: logic, propositional equivalence, predicate and Quantifiers. Function: function, growth of a function, sequences and summations. Properties of integers: introduction, algorithm of division and multiplication, primes, GCD, LCM, Euclidean algorithm, congruence relation. Mathematical reasoning: proof techniques, induction, recursive definitions and algorithms.

Graph theory: Graph, Paths, Trees .Counting and Advanced counting Techniques: permutations and combinations, pigeonhole principle, generating functions. Algebraic Systems: Introduction, operations, Semi-groups, Groups, Rings and Fields. Introduction to language and grammars.

CSE 306 Sessional based on CSE 305

EE 303 Analog Electronic Circuits

Introduction to Semiconductor, Junction diode, Bipolar Junction transistor Small signal low frequency transistor model, Amplifiers, Darlington pairs, Introduction to Oscillators, differential amplifiers, Op-Amp, and their gain, input and output impedances, offset null adjustment, frequency response and noise.

Introduction to JFET, MOSFET, NMOS and CMOS; Biasing and application in switching circuits, SCR, TRIAC, DIAC, UJT : characteristics and applications, Introduction to rectifiers, active filters, regulated power supply, Stabilizer and UPS, SMPS and IC fabrication techniques.

EE 304   Analog Electronic Circuits
Sessional based on EE 303

Math 307   Mathematics – III

Vector Analysis: Vectors: Definition Equality, Addition and multiplication linear dependence and independence, Differentiation and integration, Line, surface and volume integrals, function, Divergence and curl and their application Physical significance of gradient, divergence and curl, Vector, identities Integral forms of gradient, divergence and curl, Divergence theorem, ,Stock's theorem, Green's theorem and Gauss's theorem.

Matrix: Definition of matrices, equality of matrices, Addition, Subtraction and Multiplication of Matrices, Equivalence of Matrices, Adjoint of square matrices, Transpose and inverse of matrices, Rank of matrices, Systems of Linear Equations, Solution of Homogeneous and non-homogeneous system by Matrix method and Cramers's rule, Determination of Eigen value and Eigen vectors, Linear transformations, Quadratic forms.

CSE 307   Digital Techniques

Digital logic, Boolean algebra, Boolean function, Canonical forms, Minimization of Boolean functions, Logic gates and their truth tables, Combinational   logic circuit design, Arithmetic and data handling logic circuits. Decoders, encoders, multiplexed, demultiplexer.

Diode logic gates, transistor switches, transistor gates, MOS gates, Logic Families : TTL, ECL, IIL and CMOS logic with operation details. Propagation delay, product and noise immunity. Open collector and High impedance gates. Electronic circuits for flip-flop, counters, registers and memory devices.

Timing Circuits : Applications of logic gates in timing circuits OP-Amp applications in timing circuits using 555 IC.

CSE 308   Sessional based on CSE 307

Hum 307 Industrial Management & Accountancy

Industrial Management: Management: Principle of Management, Management functions, Management skills, Authority& Responsibility, Span of control, Management by objective, Consultative management, Participative management, Decision Making, Manpower motivation,

Leadership process, Management environment. Human Resources Management: Manpower planning, Recruitment & Selection, Employee training & Development, Performance appraisal, Wages & Salary administration. Production Management: Plant layout: Definition, Objectives, Basic layout types, Production control: Routing, Scheduling dispatching& follow-up, Inventory control: Function, Purpose, EOQ, Lead time, Sefty stock, re-order point. Material handling & Maintenance.

Accountancy : Basic accounting principles, Journals Cash book, trial Balance, Balance Sheet, Bank Reconciliation statement. Cost Accounts and objectives ; Costs ; Classification, Preparation of cost sheet, Computation of break even point, Standard costing, Process costing and Overhead Allocation.

SECOND YEAR FOURTH SEMESTER

CSE 401 Algorithm Design and Analysis

Technique for analysis algorithms, methods for the design of efficient algorithms: divide and conquer, greedy method, dynamic programming, backtracking, branch and bound.

Basic search and traversal techniques, graph theory, algebraic simplification and transformation, Lower bound theory, NP-hard and NP-complete problems.

CSE 402   Sessional based on CSE 401

EE 403   Electrical Machines and Applications

D. C. Machines : Operation and performance characteristics of generators and motors . Starting, speed control and braking of motors. Different application of DC motors.

AC. Machines : Transformer : Principle of operation of transformer. Three phase Induction motor : Principles of operation, equivalent circuit and circle diagram. Torque-speed characteristics. Methods of speed control, starting and braking of induction motors. Single phase induction motors and its methods of starting.

Synchronous machines and motors : Principles of operation and equivalent circuit. Method of synchronization. Typical application of A.C. motors in industries, special motors: Stepper motor,. Servomotor. Brush less motors.

EE 404   Electrical Machines and Applications
Sessional based on EE 403

Math 407   Mathematics – IV

Complex Variable : Complex number systems, General functions of a complex variable, Limits and continuity of a function of complex variable and related theorems, Complex differentiation and the Cauchy-Riemenn equations, Infinite series, Convergence and uniform convergence, Line integral of a complex function, Cauchy integral formula, Liouville's theorem, Taylor's and Laurent's theorem, Singular points, Residue, Cauchy's residue theorem.

Differential Equations : Solution of differential equation by the method based on the factorization of the operators, Frobenius method, Bessel's and Legendxe's differential equations, Portal Differential Equations : Partial differential equations, Particular solutions with boundary and initial conditions.Laplace transform and its application

CSE 405   Numerical Method

Solution of algebraic and Transcendental equation: Iterative method, Gauss elimination method, Gauss-seidal method and their application in Engineering fields. Interpolation: Interpolation with one and two independent variables. Formation of different difference table. Newton's forward and backward difference, Langrange's interpolation, Aitkens interpolation, Successive iteration.

Numerical Integration: Trapezoidal rule Gauss Quadratic formula, multiple integration, Rombergs method, Truncation and error estimation. Numerical solution of differential equations ,Numerical solution of partial differential equations, curve fitting, Methods of least square, Estimation of linear and nonlinear parameters, formulation, different engineering experimental results.

CSE 406   Sessional based on CSE 405

CSE 407 Finite Automata Theory and Pulse Techniques

Reliable design and Fault Diagnosis, Hazards, Fault detection in Combinational circuits, Fault location experiments, Threshold Logic.

Synchronous sequential circuits and Iterative networks, Sequential machine state equivalence and machine minimization, Asynchronous Sequential circuits, Finite state recognizer-regular expressions, transition graphs.

Linear wave shaping : diode wave shaping techniques, clipping and clamping circuits, comparator circuits, switching circuits. Pulse transformers, pulse transmission, pulse generator : monostable, bitable and astable multivibrators ; Schmitt trigger ; Blocking oscillators and time - base circuit Timing circuits . Simple voltage sweeps, linear current sweeps.

CSE 408   Sessional based on CSE 407

THIRD YEAR FIFTH SEMESTER

CSE 500 Internet Programming Lab / Project

Internet and World Wide Web applications, HTML, SGML, XML, CGI Programming, Electronic Commerce, Internet Database, Java Script, VB Script.

CSE 501   Data Base Systems

Database Concepts : Files and Databases, Database Management Systems, Data models, Relational data model : Relations, Domains, Attributes and Tuple, Anomalies, Functional Dependency, First, Second and third normal forms, Boyce-Code Normal form, Relational calculus based languages-SQL and QBE, Relational algebra and Set operations. Relational database design : Relational design criteria, Loss less decomposition, decomposition algorithms, synthesis algorithms, Different RAID levels.

Advance Database Concepts : Fourth and fifth normal forms, Object-oriented databases. Entity-Relationship (ER) approach : The ER model and its constructions, ER modeling in logical database, design. Transformation of the ER model to SQL, Distributed database design. The MAM technique : Fact types, Uniqueness constraints, Parity Checking General constraints, Conceptual schema transformations, Relational implementation.

CSE 502   Sessional based on CSE 501

EE 503   Instrumentation

Measuring Instruments: Electromechanical and electronic meters, their uses. Panel metering. Extension of Instrument range.

Transducers: Different types of transducers and their principle of operations: Position and displacement Transducers, Potentiometer, Linear variable differential transformers (LVDT), Pressure transducer, Temperature transducer, Optical transducer, Flow transducer, Strain gauge transducer, Ultrasonic transducer; Humidity transducer, Hall Effect transducer, and Speed transducer.

EE 504   Instrumentation
Sessional based on 503

CSE 503 Software Engineering

Software engineering principles; life cycle models; sizing, estimation, planning and control requirements specification; functional specification and design using Z; Risk Analysis and Management, Software quality assurance; configuration management; software maintenance.

Management of programming teams, programming methodologies, Integration and Testing Strategies, The art of debugging, evaluation and measurement of software, verification and testing techniques, and the problems of maintenance, modification and Portability. Web engineering, Re engineering.

CSE 505   Applied Statistics & Queuing Theory

Statistics : Frequency distribution, Mean median Mode and other measure of central tendency standard deviation and other measure of dispersion, Moments, Skewness and kurtosis, Elementary probability theory, Characteristics of distributions, elementary sampling theory, Estimation, Hypothesis testing and regression analysis. Probability distribution and expectations, discontinuous probability distribution, e.g. binomial, position and negative binomial. Continuous probability distributions, e.g. normal and exponential.

Stochastic processes, Discrete time Markov chain and continuous time Markov Chain. birth-death process in queuing.

Queuing models : M/M/1,M/M/C,M/G/1,M/D/1,G/M/1 solution of network of queue-closed queuing models and approximate models. Application of queuing models in Computer Science.

CSE 507 Microprocessors & Assembly languages

Machine and assembly language programming, Introduction to different types of microprocessors and its applications, Intel 8086 microprocessor: Architecture, Instruction Format, Instruction Sets, Opcode, Processor status and Flag registers, Addressing modes, Branching and Looping, Interrupt Structures, I/O interfacing, DMA.

Assembly language :program writing debugging and execution, Programming in Microcomputers, Subroutine and reentrant programs, and Disk file handling Assembly language programming, Co-processors. An overview of Intel 8088, 80186,80286,80386,80486 and Pentium Processors, RISC processors, Power PC processor, CISC processor, Direct video RAM accessing, Memory module.

CSE 508   Sessional based on CSE 507

THIRD YEAR SIXTH SEMESTER

CSE 600 Software Development Project – III

Students will work in groups or individually to develop three high quality Software / Projects including new I/O drivers or similar projects involving operating systems modules in different types of Data Base Systems or object oriented and visual languages, Students will write structured program and use proper documentation.

CSE 601 Operating Systems

Introduction to operating system, Process management: process synchronization and mutual exclusion, two process solution and Dekker's algorithm, semaphores, examples (producer-consumer, readers-writer, dining philosophers, etc.). CPU scheduling: multiprogramming and time sharing, scheduling approaches (SJF, FIFO, round robin, etc.). Input/Output: device controllers and device drivers, disks, other devices.

Memory Management: with and without swapping, virtual memory – paging and segmentation, page replacement algorithms, implementation. File systems: FS services, disk space management, directory and data structures. Deadlocks: modeling, detection and recovery, prevention and avoidance. Case study: Unix, MS DOS.

CSE 602   Sessional based on CSE 601

CSE 603 Computer Architecture

Introduction to computer Hardware and Software. Addressing methods and machine level instructions. Instruction Sets. Components of a computer system : Processors, memory secondary storage devices and media, and other input output devices. Processor organization : register, buses, multiplexers, decoders, CPU, ALUs. clocks, main memory and caches. Arithmetic and Logical processing unit, Micro-programmed control unit.

Information representation and transfer ; instruction and data access methods ; the control unit : hardware and micro-programmed ; Interrupts, DMA, Memory organization, Computer peripherals, Von Neumen SISD organization, RISC and CISC machines.

CSE 605   Data Communications

Representation of Signals in Time and Frequency Domain, Properties of Fourier Transform, Delta Function, Auto-Correlation and Cross-Correlation, Introduction to Modulation Techniques, ASK, FSK, PSK, Correlators, Pulse Modulation: Pulse Amplitude Modulation, Pulse Width Modulation and Pulse Position Modulation, Pulse Code Modulation, Quantization, Delta Modulation. TDM, FDM, OOK, FSK, PSK, QPSK. Various Encoding Techniques, Representation of Noise: Threshold effects in PCM and FM.

Probability of Error for Pulse Systems, Channel Coding and Capacity, Asynchronous and Synchronous Communications, Hardware Interfaces: Multiplexers, Connectors and Buffers, Communication Medium, Fiber optics, Infrared and Bluetooth Technology, Microwave Communication.

CSE 606   Sessional based on CSE 605

CSE 607 Peripheral & Interfacings

Hardware and Software interfacing in Microcomputer System Design, I/O Design and Total System Design, Microprocessor based system design : Hardware design, Building, Debugging, Testing and Linking program modules, Programming EPROM. Multi-processor configurations : co-processor configurations, Numeric data processor, I/O Processors, Advanced Micro-programming : Bit-Slice Microprocessor, Parallelism in Microprocessor.

Traps and Interrupts, address space partitioning, AD and DA converters and some related chips. Interfacing ICs of I/O devices. I/O ports, Programmable peripheral interface, DMA controller, interrupt controller, communication interface, interval timer, etc, ; IEEE - 488 and other buses, interfacing with microcomputer. Interfacing I/O devices - floppy disk, hard disk, tape, CDROM

and other optical memory, keyboard, mouse, monitor, plotter, scanner, etc. Microprocessor in Scientific Instruments and other Applications Display: Protective relays, Measurements of Electrical quantities, Temperature monitoring system, water level indicator, motor speed controller, Traffic light controller, etc.

CSE 608   Sessional based on CSE 607

CSE 609   Artificial Intelligence & Expert System

Introduction: Definition of Al, Historical Development of Al, Application of Al. Al Techniques, Logic: Propositional Logic, First-order logic, Resolution principle, Problem representation: State-space Representation, Problem-reduction representation, Production systems: PS structure, Recognition-Action Cycle, Inference Directions, Blackboard systems, PS implementation. Frame Representation: Basic structure, Inheritance of properties, Slot Extension implementation. Relational Data model: Relational database model, Entity and relationship Generalization and Aggregation. Search: Blind and non-blind searches, Depth-first search, Breadth-first search, Heuristic search, Best-first search, Optimal search, A search implementation complexity.

Fuzzy knowledge: Probability theory, Dempster-shafer theory, Fuzzy set theory, Export systems, Natural language processing: Syntactic Semantics and pragmatic, Top-down passing, Bottom-up pursing, Lexicon, Programming Languages for Al Research: Historical overview, Features of Al programming languages, Major Al programming languages LISP, PROLOG.

CSE 610   Sessional based on CSE 609

FOURTH YEAR SEVENTH SEMESTER

CSE 700   Project Thesis-I

Study of problems in the field of Computer Science and Engineering.
N.B : The project and thesis topic selected in this course is to be continued in the CSE 800 course.

CSE 701   Compiler Design

Introduction to compiler : Compiling techniques including parsing, semantic processing, and optimization; Complier-compliers and translator writing systems. Lexical analyzer, regular

expression, non-deterministic finite automata (NFA) and deterministic finite automata (DFA), contexts free grammar, ambiguous grammar basic parsing techniques.

Scope rules, Intermediate code, block structure, data structure for symbol table, and symbol tables; Run-time stack management and run time support; Parameter passing mechanisms; Stack storage organization and templates; Heap storage management.

Code generation Macros; code optimization, Error management; Error detection and recovery. A small project.

CSE 702   Sessional based on CSE 701

CSE 705   Information System Analysis & Design

Application development policy and strategies: Planning of information system, Policy in information system development, Strategies for achieving information system Goals.

Application system development life cycle: Phases in application system development, Interrelationship among each phase. Feasibility assessment: Problems and Needs in information system development, Preliminary application requirements determination, Feasibility assessment: Economic, technical, operational and schedule feasibility.

Information requirements determination: Strategies for obtaining information requirements, Technique for information requirements determination, Methods for providing assurance that requirements are correct and complete. Structured systems analysis: Steps in structured systems analysis, Activity diagrams and related documentation, Data dictionary, Problem analysis, Structured walk through. Systems design methodology: Check list methodology, Process-oriented methodology, Application Generator, Structured design, Program development and testing: structured programming, Method for testing.

CSE 706   Sessional based on CSE 705

CSE 707   Computer Networks

Network Architecture: layered architecture and ISO-OSI reference model: TCP/IP error control Frame relay, SMDS, ATM, ADSL, control, HDLC, X25, flow and congestion control, virtual terminal protocol, data security.

Local area networks, satellite networks, wireless LAN packet radio networks, Introduction to ARPANET, SNA and DECNT. Topological design and queuing models for network and distributing computing system.

CSE 708   Sessional based on CSE 707

CSE 713   Digital Signal Processing

Discrete time description of signals and systems, Sampling of DCT signals, Fourier transform of discrete time signals, Discrete Fourier transform.

Z- transform, Digital filter structure, Infinite Impulse Response filter design techniques, Finite impulse response filler design techniques, finite precision effects, Inverse filtering.

CSE 714   Sessional based on CSE 713

CSE 721   Unix Programming

Introduction to UNIX, History, Layering, OSI Model, UNIX Model.
C Programming tools in UNIX, The C Language, single and multi module programme, UNIX file dependency system, UNIX Archive System, UNIX source code control system, UNIX profiler, UNIX debugging, System Programming.

Inter process communication, communication protocols, TCP/IP, XNS, SNA, NetBIOS and OSI protocols, UUCP, Berkley Sockets, UNIX domain protocols, Socket Addresses, elementary and advanced socket UNIX shells, Shell functionality, systems calls, System verses Transport Layer Interface, Transport Endpoint addresses, elementary a and advanced TLI functions, I/O Multiplexing, Library Routines, time and Date Routines, Ping Routines.

CSE 722   Sessional based on CSE 721

CSE 725   Human Computer Interaction

Introduction to Human-computer interaction (HCI), human information processing systems, Models of interaction, Approaches to HCI, User interface.

User system interaction : analysis and design, User interface design, Interface technique and technology, case studies.

CSE 726   Sessional based on CSE 725

CSE 727   Digital System Design

Combinational logic with MSI and LSI circuits, Sequential circuits, registers, counters and memory unit, register transfer logic, micro operations, processor logic design

Control logic design, Micro-programmed control, Pipeline and vector processing, Computer arithmetic, microcomputer system design : Case study

CSE 728   Sessional based on CSE 727

CSE 731   Simulation & Modeling

Simulation methods, Model building, random number generator, Statistical analysis of results, validation and verification techniques, Digital simulation of continuous systems.

Simulation and analytical methods for analysis of computer systems and practical problems in business and practice. Introduction to the development of simulation packages.

CSE 732   Sessional based on CSE 731

EE 701   Control System Engineering

Introduction : Response of 2nd higher order systems to impulse, step, ramp and sinusoidal inputs, Root locus technique, Routh-Hurwitz and Nyquist stability criterion.

State variable and transition matrix. Pl and PID controllers, Specifications in time and frequency domain, Series compensation-lead, lag and lag-lead compensation design using Bode plots, Nichol's chart Carrier control system, Introduction to sampled data control system.

CSE 703   VLSI Design

Introduction to Microelectronics and MOS Technology, Basic Electrical Properties and Circuit Design Processes of MOS and Bi CMOS Circuits, Inverter Circuits, Sub-System Design Processes and Layout, Scaling of MOS Circuits: Scaling Models and Scaling Factors, Limitation of Scaling.

Computational Elements: Design of an ALU Sub-System, Adder, Multipliers, Memory Registers, Dynamic & Static Flip-Flops, Bus Arbitration and Aspects of System Timing. CMOS Fabrication, Practical Aspects of Design Tools and Test-Ability CMOS Design, Behavioral Description, Structural Description, Physical Description and Design Verification. Introduction to Ga-As Technology: Ultra-Fast Circuits and Systems.

EE 717   Telecommunication Switching

Introduction to telegraphy, single and double current telegraphy, teleprompters, VFT and carrier telegraphy, introduction to telegraphy, manual switching system, electromechanical switching stronger and EMD system, electronic switching, Read relays, basic imposing circuits, uniselectors group selectors and final selectors; trucking diagram-stronger system and EMD system: Distribution frames-testing and protection of telephone lines. traffic calculation introduction to network planning.

Transmission principles, power levels, attenuation and delay distortions, wireless telephony. carrier telephony, repeater, SBB transmitters and receivers, high accuracy crystal lattice filters. Introduction to VHF and UHF systems.

FOURTH YEAR EIGHT SEMESTER

CSE 800   Project and Thesis-II

Continuation of project and thesis topic undertaken in CSE 700

CSE 801   Computer Graphics

Introduction to computer graphics: History, Application of computer graphics (Computer Aided Design Animation). A survey of graphics I/O devices and types, Graphics software design : survey of desired function, toward a universal graphic language. Display files, Data bases for pictorial application : Graphics techniques : Point-plotting techniques, Line drawing, Geometric Transformations, windowing and clipping, Raster graphics, Hardware for computer graphics : Typical small and large system, Graphic terminals, plotters, graphic display processors. Device independent graphics systems. Graphics software: A simple graphic package, Segmented display files, Geometric models, Picture structure, Interactive graphics: input techniques, Event handling, three-dimensional graphics, Curves and surfaces, 3-D transformation. Hidden surface problem: Back face removal, Hidden-Line removal Curved surfaces.

Describing points, lines and polygons, some hints for building polygonal models, Color perception, Computer color, RGBA versus Color index mode, RGBA display mode, color-index

display mode, Dithering, Blending, 3-D blending with the depth buffer, Antialiasing, Antialiasing points or lines, Antialiasing polygons, Fog, Fog equations, the OpenGL ARB, How does OpenGL works, API specifies: data types, function naming conventions, platform independence, Drawing shapes with OpenGL, animation with OpenGL and GLUT, Drawing in space: Lines, Points and Polygons, Coordinate transformations: understanding transformations, matrix munching projections, matrix manipulation color lighting and materials, Texture mapping.

CSE 802   Sessional based on CSE 801

CSE 809   Neural Networks & Fuzzy Systems

Introduction Human Brain Mechanism, Neural Machine Intelligence. Neural Dynamics: Activation and Signals, Activation Models, Synaptic Dynamics: Learning Strategies, Single and Multilayer Perception, Kohonen's SOM, Hopfield Network, Associative Memory, Vector Quantization, Adaptive Resonance Theory (ART), Boltzman Machine. Equilibrium of Learning System. Concept of Neuro-Fuzzy and Neuro-GA Network.

Fuzziness Vs. Probability, Fuzzy Associative Memory, Comparison of Fuzzy and Neural Backerupper Control Systems, Fuzzy Image Transform Coding, Comparison of Fuzzy and Filter, Target Tracking Control Systems. *Genetic Algorithm:* Basic Concepts, Offspring, Encoding, Reproduction, Crossover, Mutation Operator, Application of GA.

CSE 810   Sessional based on CSE 809

CSE 820   Seminar

Student will work in groups or individually to prepare review papers on topics assigned by the teachers and will present before audience.

CSE 821   Network Planning

Introduction to Networks, Network components, theoretical network, real world networks, designing the LAN, configuring the network server and client.

Network administration, remote access, expanding the network, wide area network troubleshooting, major protocol suites, internet and intranets, Internet programming.

CSE 823   Advanced Computer Architecture

Pipe lined processor design, Cache memory, Memory system design, concurrent processor. Vector processors and multi-processors, Array processors.

Parallelism in multi-processors and Multi-computers, computer-intensive processors and Multi-computers, Automatic vectorization, Hypercube systems and key application, Data flow computation.

CSE 825   Robotics and Computer Vision

Robotics manipulation direct kinematics : The arm equation, inverse Kinematics : Solving the arm equation, work space analysis and trajectory planning differential motion and static manipulator dynamics, robot control, task planning.

Relationship between image and world structure, image representation segmentation pattern perspective transformation camera calibration, shape analysis, object recognition and picture languages

CSE 827   Network Security

The OSI security architecture, A model for network security, classical encryption techniques. Block ciphers and the Data Encryption Standard (DES). Triple DES, placement of encryption standard. Traffic confidentiality. Key distribution. Introduction to number theory. Principles of public key crypto system. The RSA Algorithm. Key management, Diffle-Hellman key exchange.
Message Authentication and hash functions, Message Digest Algorithm, Secure Hash Algorithm, HMAC, Authentication protocols, Digital signature standard. E-mail security, IP security, web security, Fire-wall design principles. Trusted systems.

CSE 829   Decision Support System

Introduction to Decision support system (DSS), Decision making models, Under-layer framework for DSS, Hardware and Software for DSS, Use of decision tools.

Developments of DSS, issues of model management and interface design, DSS applications: Executive information system (EIS), Computer mediated communication within an organization and special aspects.

CSE 831   Knowledge Engineering

Knowledge engineering basic knowledge representations and utilization : Production systems (PS), semantic networks. frames, logic, object-oriented paradigm, logic programming, probability theory, dempster-shafer theory, Fuzzy set theory.
Application : Diagnosis, Knowledge acquisition and machine learning: Problems of and Application to knowledge acquisition, knowledge acquisition support systems, Machine learning meta-reasoning and meta-knowledge, knowledge system development environment al languages, shells.

CSE 833   Digital Image Processing

Introduction, Digital image fundamentals, image transforms, image enhancement image restoration, image compression.
Image segmentation, Representation and Description, Recognition and interpretation

CSE 835   Parallel and Distributed Processing

Parallel Processing: Parallel processing and its Importance, Architectures for parallel processing-Classifications, comparative study of different architectures, PRAM models, parallel memory organizations, Multiprocessor Operating Systems, Hardware issues in parallel processing, Multiprocessing controls and Algorithms, Parallel programming models, Parallel languages and compilers.

Distributed Processing: Introduction: Communication Architecture and Protocols, Inter process communication, Remote Procedure Calls, Group Communication, Time and Coordination, Distributed Shared Memory, Distributed Operation Systems, Distributed File Services, Distributed Transactions, Design of Distributed Data, Distributed Database and Network Management, Distributed Objects.