Department of Computer Science & Engineering

Revised Syllabi (Brief) for BTech in Computer Science and Engineering (2010 Admission onwards)

MA2001: MATHEMATICS III

Pre-requisite: MA1001 Mathematics I

L	T	P	C
3	1	0	3

Probability distributions:- Random variables, Binomial distribution, Hyper- geometric distribution, Chebyshev's theorem, Poisson distribution, Geometric distribution, Normal Distribution, Uniform distribution, Gamma distribution, Beta distribution, Weibull distribution. Joint distribution of two random variables. Sampling distributions and Inference concerning means:- Population and samples, The sampling distribution of the mean, Sampling distribution of the variance, Maximum Likelihood Estimation, Point estimation and interval estimation, Tests of hypothesis, Inference concerning variances proportions:- Estimation of variances , Estimation of proportions, Analysis of r x c tables, Chi – square test for goodness of fit. Regression Analysis:- Bi-variate Normal distribution- joint, marginal and conditional distributions. Curve fitting, Method of least squares, Estimation of simple regression models and hypothesis concerning regression coefficients, Correlation coefficient- estimation of correlation coefficient, Analysis of variance:- General principles, Completely randomized designs, Randomized block diagram, Latin square designs, Analysis of covariance.

Total Hours: 56 Hrs

CS2001 LOGIC DESIGN

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Number systems and codes, Boolean algebra, K map: prime cubes, minimum sum of products and product of sums, Quine-McClusky algorithm, prime implicant chart, cyclic prime implicant chart, Petrick's Method, Combinational Logic: analysis and design of combinational logic circuits, parallel adders and look-ahead adders, comparators, decoders and encoders, code conversion, multiplexers and demultiplexers, parity generators and checkers, Programmable Logic Devices, PLA folding, design for testability. Introduction to sequential circuits, memory elements, latches, Flip-flops, analysis and design of sequential circuits, Mealy and Moore models, registers, shift registers, counters.

Total Hours: 70 Hrs

CS2002 FOUNDATIONS OF PROGRAMMING

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:

Procedural Abstraction, Recursion, Data Abstraction, Combining different data types, Modularity, Objects, State Modeling with mutable data, Concurrency, Metalinguistic Abstraction, Lazy evaluation.

Total Hours: 56 Hrs

EC2014 SIGNALS AND SYSTEMS

Pre-requisite: Nil

L	T	P	C
3	0	0	3

Brief Syllabus:

Elements of signal theory - LTI and LSI systems - convolution - causality and stability - signal analysis - Fourier representation - Fourier transform - spectral density - Hilbert transform - frequency domain analysis of LTI systems - Sampling theorem - discrete Fourier transform - Laplace and Z transforms.

Total Hours: 42 Hrs

CS2091 LOGIC DESIGN LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Design and implementation of logic gates, adder and subtractor circuits, parity generators, code converters, comparators, multiplexers, demultiplexers, flip-flops, shift registers, counters.

Total Hours: 56 Hrs

CS2092 PROGRAMMING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Programming assignments in the language of choice to emphasize the concepts of procedural and data abstraction, Design and Implementation of a simple language interpreter

Total Hours: 56 Hrs

MA2002: MATHEMATICS IV

Pre-requisite: MA1001 Mathematics I, MA1002 Mathematics II

L	T	P	C
3	1	0	3

Series Solutions and Special Functions: Power series solutions of differential equations, Theory of power series method, Legendre Equation, Legendre Polynomials, Frobenius Method, Bessel's Equation, Bessel functions, Sturm- Liouville's Problems, Orthogonal eigenfunction expansions. Partial differential Equations: Cauchy's problem for first order equations, Linear Equations of the first order, Nonlinear Partial Differential Equations of the first order, Charpit's Method, Special Types of first order equations, Classification of second order partial differential equations, Wave equation, Heat equation, Laplace equation, Solution of a Partial Differential Equations by Laplace transforms. Complex functions, Derivative , Analytic function, Cauchy- Reimann equations, Laplace's equation, Geometry of Analytic functions: Conformal mapping, Linear fractional Transformations, Schwarz - Christoffel transformation, Transformation by other functions, Line integral in the Complex plane, Cauchy's Integral Theorem, Cauchy's Integral formula, Derivatives of analytic functions.Power series, Functions given by power series, Taylor series and Maclaurin's series. Laurent's series, Singularities and Zeros, Residue integration method, Evaluation of real Integrals.

Total Hours: 56 Hrs

CS2004 COMPUTER ORGANIZATION

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Measuring performance-evaluating, comparing and summarizing performance, Computer arithmetic, integer and floating point arithmetic, processor design, pipelined processors, memory hierarchy, caches and virtual memory, Input/output design.

Total Hours: 70 Hrs

CS2005 DATA STRUCTURES AND ALGORITHMS

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:

Searching and sorting algorithms, dynamic memory and recursion, lists, stacks and queues, binary search trees, hashing, B Trees, Graph search, Minimum Spanning Tree and shortest path algorithms.

Total Hours: 56 Hrs

CS2006 DISCRETE STRUCTURES

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:

Combinatorics - asymptotic analysis of recurrences - discrete probability- random variables -linearity of expectations - introduction to groups, rings and fields - introduction to logic and set theory

Total Hours: 56 Hrs

CS2093 HARDWARE LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

80X86 Assembly language programming-integer and floating point operations, string manipulation, Embedded System experiments using RTLinux, Performance evaluation of various cache organizations and optimizations.

Total Hours: 56 Hrs

CS2094 DATA STRUCTURES LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Implementation of standard searching, sorting algorithms, tree, expression evaluation and graph algorithms.

Total Hours: 56 Hrs

CS3001 THEORY OF COMPUTATION

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:

Regular languages and finite automata, Context free languages, push down automata, Turing machines, Recursion theorem, Undecidability, Complexity, Reductions and Completeness, Hierarchy theorems, Space Complexity, Logic.

Total Hours: 56 Hrs

CS3002 DATABASE MANAGEMENT SYSTEMS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Database System Concepts and Architecture, Data Modeling using ER model, Relational data model, Relational algebra and Relational calculus, SQL, Relational database design using ER to relational mapping, Database design theory and Methodology, Functional Dependencies and Normal Forms, Relational Database Design algorithms, Data storage, Indexing and physical design, Transaction processing concepts, Concurrency Control, Introduction to Database Security.

Total Hours: 70 Hrs

CS3003 OPERATING SYSTEMS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus: Review of operating system strategies –processes and threads, Process management, inter-process communication, deadlock, memory management- virtual memory, file systems protection and security, Virtual machine monitor –issues and challenges

Total Hours: 70 Hrs

CS3004 SOFTWARE ENGINEERING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Software Development Life Cycle – Detailed study of the phases involved – Requirements Engineering - formal specification – Design – Abstraction, Partitioning and Patterns – Coding and Testing – Software Project Management – Metrics for costing, scheduling and risk assessment.

Total Hours: 70 Hrs

CS3005 COMPILER DESIGN

Pre-requisite: CS2005 Data Structures and Algorithms

L	T	P	C
3	0	2	4

Brief Syllabus:
Lexical analysis: Specification and recognition of tokens. Syntax analysis: Top-down parsing-Recursive descent and Predictive Parsers. Bottom-up Parsing- LR (0), SLR, and LR (1) Parsers. Semantic analysis: Type systems, symbol tables and type checking. Intermediate code generation: Intermediate representation-Three address code and quadruples. Syntax-directed translation of declarations, assignments statements, conditional constructs and looping constructs. Runtime Environments: Storage organization, activation records. Introduction to machine code generation and code optimizations.

Total Hours: 70 Hrs

CS3006 COMPUTER NETWORKS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Introduction- components and services, performance, layering. Application layer - protocols, pocket programming. Transport layer – services, protocols. Network layer- services, routing, protocols, IPv6, multicasting. Link Layer-services, error handling, protocols, devices, wireless networking. Multimedia networking- applications, protocols, QoS. Security, Network management.

Total Hours: 70 Hrs

CS4001 ENVIRONMENTAL STUDIES

Pre-requisite: Nil

L	T	P	C
3	0	0	3

Brief Syllabus:
Resources - conservation- ecosystems - biodiversity - pollution - population - human rights.

Total Hours: 42 Hrs

MS4003 ECONOMICS

Prerequisite: Nil

L	T	P	C
3	0	0	3

Micro Economics, Demand and Supply Forces, Elasticity concepts, Short run and long run costs, Market Structure, Pricing in different markets, Macro Economic Aggregates-Gross Domestic Product, Inflation , Fiscal and Monetary Policies ; Monetary system; Money Market, Capital market; Indian stock market; International trade -   Foreign exchange market- Balance of Payments (BOP) and Trade ,International Trade and development and role of international institutions.

Total Hours: 42 hours

ME4104 PRINCIPLES OF MANAGEMENT

Prerequisite: Nil

L	T	P	C
3	0	0	3

Introduction to management theory, Characteristics, Systems approach, Task responsibilities and skill required, Process of management, Planning, Organizing, Directing, Controlling, Decision making process, Project management, Overview of operations management, Human resources management, Marketing management, Financial management.

Total Hours: 42 Hrs

CS4021 NUMBER THEORY AND CRYPTOGRAPHY

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Divisibility theory and congruence theory – Fermat's little theorem, Euler's generalization, Chinese remainder theorem - Quadratic Reciprocity. Algorithmic number theory – Primality Testing.
Symmetric Key and Public Key cryptosystems – DES, D-H, and RSA. Protocols for authentication – Needham Schroeder. Zero Knowledge Proof Systems – Fiat Shamir Identification Scheme.

Total Hours: 70 Hrs

CS4022 PRINCIPLES OF PROGRAMMING LANGUAGES

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Programming Languages: Concepts and Constructs. Untyped Arithmetic Expressions – Introduction, Semantics, Evaluation. Untyped Lambda Calculus – Basics, Semantics. Programming in Lambda Calculus. Typed Arithmetic Expressions – Types and Typing relations, Type Safety. Simply Typed Lambda Calculus – Function types, Typing relations, Properties of typing. Extensions to Simply Typed Lambda Calculus.

Total Hours: 70 Hrs

CS4023 COMPUTATIONAL INETELLIGENCE

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Artificial Intelligence, Structures and Strategies for state space search, Knowledge representation, AI Representational Schemes, Machine Learning, Planning, Genetic algorithm, Genetic Programming, Rule based Expert Systems, Introduction to Natural Language Processing, Languages and Programming Techniques for AI.

Total Hours: 70 Hrs

CS4024 INFORMATION THEORY

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:
Source coding theorem – Shannon Fano, Huffman and Lempel Ziv codes - channel coding theorem for BSC and BEC - capacity achieving codes for BEC - Cryptography - Perfect Secrecy - Shannon's theorem.

Total Hours: 56 Hrs

CS4025 GRAPH THEORY AND COMBINATORICS

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:
Generating functions and applications - Ramsey theory - Lovasz local lemma and applications - matching and connectivity in graphs - graph coloring.

Total Hours: 56 Hrs

CS4026 COMBINATORIAL ALGORITHMS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Primal dual theory and applications to algorithm design, Applications to network flow, matching and other graph problems. Approximation algorithms based on primal dual theory.

Total Hours: 70 Hrs

CS4027 TOPICS IN ALGORITHMS

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:
Introduction to randomization - discrete probability and randomized algorithms, Derandomization, probabilistic proofs, probabilistic complexity classes, Kolmogorov complexity, Godel's theorem

Total Hours: 56 Hrs

CS4028 QUANTUM COMPUTATION

 Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:
Quantum mechanics fundamentals, Models for Quantum Computation, Quantum algorithms, Speeding up the solution of NP Complete problems, Quantum error correcting codes , Quantum cryptography , Quantum fault tolerance

Total Hours: 56 Hrs

CS4029 TOPICS IN THEORY OF COMPUTATION

Pre-requisite: CS 3001 Theory of Computation

L	T	P	C
4	0	0	4

Brief Syllabus:

Recursion, Turing machines, Arithmetization, Turing degrees, incomparability, Kolgomorov Complexity, Scheme, Term Rewriting and substitution models of computation.

Total Hours: 56 Hrs

CS4030 COMPUTATIONAL COMPLEXITY

Pre-requisite: Nil

L	T	P	C
4	0	0	4

Brief Syllabus:
Elementary space and time complexity classes, inclusion theorems, randomization, circuit complexity classes, counting classes, sublinear space, interactive proof systems.

Total Hours: 56 Hrs

CS4031 COMPUTATIOAL ALGEBRA

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Introduction to modular arithmetic and finite fields. Algorithms for modular arithmetic, primality testing, factorization of polynomials over finite fields, Fourier analysis over finite fields and applications of algebraic algorithms to coding theory and cryptography.

Total Hours: 70 Hrs

CS4032 COMPUTER ARCHITECTURE

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Quantitative Principles, Instruction level parallelism, Limits of instruction Level parallelism, Multicore Architecture, Multiprocessor design, Memory consistency, memory subsystem design, Storage and reliability.

Total Hours: 70 Hrs

CS4033 DISTRIBUTED COMPUTING

Pre-requisite: CS2005 Data Structures and Algorithms

L	T	P	C
3	0	2	4

Brief Syllabus:
Introduction to distributed systems, Logical clocks, Direct dependency clocks, Distributed Mutual Exclusion(DME) using timestamps, token and Quorums, Drinking philosophers problem, Dining philosophers problem under heavy and light load conditions, Leader election algorithms, Global state detection, Global predicates, Termination Detection, Control of distributed computation, Self stabilization, knowledge and common knowledge, Distributed consensus, Check pointing for Recovery

Total Hours: 70 Hrs

CS4034 MIDDLEWARE TECHNOLOGIES

Pre-requisite: CS4033 Distributed Computing

L	T	P	C
3	0	2	4

Brief Syllabus:
Publish/Subscribe matching algorithm, content based models and matching, matching algorithms, distributed hash tables (DHT), content based routing algorithms, engineering event based systems, Accessing publish/subscribe functionality using APIs, Composite event detection, Topic based systems, Overlays, P2P systems, overlay routing

Total Hours: 70 Hrs

CS4035 COMPUTER SECURITY

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Operating Systems security – Access control models – BLP, Biba etc. SELinux overview. Software vulnerabilities – Buffer and Stack overflow. Network Security – Security at transport, network and application layers – Various attacks – Intrusion Detection Systems. Security in wireless domains – mobile devices security. Security in recent applications like online banking and web services.

Total Hours: 70 Hrs

CS4036 ADVANCED DATABASE MANAGEMENT SYSTEMS

Pre-requisite: CS3002 Data Base Management Systems

L	T	P	C
3	0	2	4

Brief Syllabus:
Distributed databases, Concurrency Control, Heterogeneity issues, Clustering, Indexing, Client Server Object Bases, Cache Coherence, Parallel Databases, Query processing- Index based, Query optimization: cost estimation, Query optimization algorithms, Online query processing and optimization, Recovery: Multi-level recovery, Shared disk systems, Distributed systems 2PC, 3PC, Multidimensional K- Anonymity, Logical data models for spatial databases: raster model (map algebra), vector model, Spatial query languages

Total Hours: 70 Hrs

CS4037 CLOUD COMPUTING

Pre-requisite: CS4033 Distributed Computing

L	T	P	C
3	0	2	4

Brief Syllabus:
New Computing Paradigms & Services, Parallelization in Cloud Computing, Security for Cloud Computing, Cloud Economics, Cloud Architecture, Types of Virtualization, Case studies- Xen, VMware, Eucalyptus, Amazon EC2, Information retrieval through Map Reduce, Hadoop File System, GFS, Page Ranking using Map Reduce, Security threats and solutions in clouds, mobile cloud computing, Case studies- Ajax, Hadoop.

Total Hours: 70 Hrs

CS4038 DATA MINING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Introduction to data mining. Data preprocessing and cleaning. Data mining techniques. Classification, association analysis, clusters analysis, Issues relating to large data sets. Applications to Web Mining and Bioinformatics.

Total Hours: 70 Hrs

CS4039 MULTI AGENT SYSTEMS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

General introduction to the concept of agent and multi-agent system. Abstract agent architecture, Distributed problem solving and the contract net protocol. Agent communication and agent communication languages - including KQML and FIPA ACL. Resource allocation, negotiation, Applications of multi-agent systems in complex distributed problem solving.

Total Hours: 70 Hrs

CS4040 BIOINFORMATICS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus

Molecular biology primer, Bioinformatics tools and databases, Sequence Alignment, Algorithms for global and local alignments, Introduction to Bio-programming languages, Restriction Mapping and Motif finding, Gene Prediction, Molecular Phylogenetics, Combinatorial pattern matching, Suffix Trees, Heuristic similarity search algorithms, Microarrays, Algorithms for Analyzing Gene Expression data, Protein and RNA structure prediction, Emerging trends in bioinformatics algorithms and databases.

Total Hours: 70 Hrs

CS4041 NATURAL LANGUAGE PROCESSING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Introduction to Natural Language Processing, Different levels of Language Analysis, Representations and Understanding, Linguistic Background, Grammars and Parsing, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Grammars for Natural Language, Movement Phenomenon in Language, Hold mechanisms in ATNs, Human preferences in Parsing, Encoding uncertainty, Ambiguity Resolution: Statistical Methods, Part-of-Speech tagging, Probabilistic Context-Free Grammars, Best First Parsing, Semantic Interpretation, Information Retrieval.

Total Hours: 70 Hrs

CS4042 WEB PROGRAMMING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Internet architecture – associated technologies – program development – server side architecture – synchronization and performance modeling – web development frameworks – SOA – web 2.0 – Implementations - Semantic web – introduction

Total Hours: 70 Hrs

CS4043 IMAGE PROCESSING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Fundamentals of Image processing: Digital image representation, mage model, Sampling and Quantization. Image transforms: One dimensional and two dimensional Fourier transform and other transforms. Image enhancement techniques: Spatial and frequency domain methods. Image Segmentation: Edge detection, edge operators, Line detection, Edge linking and boundary detection. Image Data Compression: Lossy and lossless Compression. Applications of Image Processing:

Total Hours: 70 Hrs

CS4044 PATTERN RECOGNITION

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Machine Perception, Pattern Recognition Systems, Baye's Decision Theory: Discriminant functions and Decision Surfaces, Normal Density. Maximum Likelihood and ayesian Parameter Estimation., Bayesian Parameter Estimation. Non Parametric Techniques: Density Estimation techniques, NN rule, Metrics and NN Classification, Fuzzy Classification. Linear Descriminant Functions: Linear Discriminant Functions and Decision Surfaces, Generalized Discriminant Functions. Multi Layer Neural Networks: Feed-forward Operation, Back–propagation Algorithm.

Total Hours: 70 Hrs

CS4045 MEDICAL IMAGE PROCESSING

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Introduction to digital image processing. Radiography. X-ray Computed tomography. Magnetic resonance imaging. Nuclear imaging. Ultrasound imaging. Image Quality, equipment, clinical use, biological effects and safety. Medical image analysis.

Total Hours: 70 Hrs

CS4046 COMPUTER VISION

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Introduction and overview, pinhole cameras; radiometry terminology. Sources, shadows and shading; Color; Spatial frequency and Fourier transforms; Normalized correlations and finding patterns. Edge detection, Texture, The geometry and views. Stereopsis - Reconstruction, human stereo; Binocular fusion, using color camera. Segmentation by clustering. Human vision, applications; segmentation by graph theoretic clustering. Segmentation by fitting a model.

Total Hours: 70 Hrs

CS4047 COMPUTER GRAPHICS

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:
Graphics Pipeline - Graphics Hardware - overview of GPU architecture - Coordinate Systems - representations, homogeneous coordinates, object, camera, world, and screen coordinate system, changing coordinate systems - Transformations - affine transformations - cumulation of transformations- Viewing and Projections - Hidden Surface Removal - Z buffer algorithm - Lighting and Shading - Textures and Mapping - Rendering Techniques Geometric Modelling -
Data structures - tree representations - Introduction to Curves Surfaces (Bezier, splines) and Meshes.

Total Hours: 70 Hrs

CS4048: TOPICS IN COMPILERS

Pre-requisite: CS3005 Compiler Design

L	T	P	C
3	0	2	4

Brief Syllabus:
Analysis, use, tests, circularity. Issues in type systems. Advanced topics in Data Flow, Control Flow and Dependency analysis, Loop optimization, SUIF Platform, Issues in compilation for ILP based processors. Effect of VLIW, Speculative, Predicated instructions, multithreaded processors. Introduction, methods, case studies, implementation.
Total Hours: 70 Hrs

CS4049 ADVANCED COMPUTER NETWORKS

Pre-requisite: CS 3006 Computer Networks

L	T	P	C
3	0	2	4

Brief Syllabus:
Layering - Data link layer - Mac Layer protocol -VLANs– Access technologies. Network Layer - IPv6 –features and challenges, API, multicasting. Routing – ISP, stability issues of routing protocols, secure routing, traffic engineering. Transport layer -TCP extensions, new options, performance, and new generation transport protocol. Application layer – DNS, P2P other new models and protocols. Experimentation - Internet traffic modelling and measurements. Security.

Total Hours: 70 Hrs

CS4050 DESIGN AND ANALYSIS OF ALGORITHMS

Pre-requisite: CS2005 Data Structures & Algorithms

L	T	P	C
3	0	2	4

Brief Syllabus:

Fundamentals of algorithm analysis, asymptotic analysis, amortized complexity, Problem Solving, Classical algorithm paradigms, complexity, reductions, NP Completeness, Probabilistic Algorithms

Total Hours: 70 Hrs

CS4051 CODING THEORY

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Linear codes, finite fields, cyclic codes, decoding cyclic codes, convolutional codes, trellis decoding, expander graphs and graph based codes.

Total Hours: 70 Hrs

CS4052 LOGIC FOR COMPUTER SCIENCE

Pre-requisite: Nil

L	T	P	C
3	0	2	4

Brief Syllabus:

Propositional logic, Syntax and Semantics, Soundness , Completeness, Predicate logic, Syntax and Semantics, Soundness , Completeness, Linear time Temporal Logic(LTL), Syntax and Semantics, Buchi Automata, Automata theoretic methods, Satisfiability, Model checking, Verification, Tools used for verification.

Total Hours: 70 Hrs

CS3091 COMPILER LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Generation of lexical analyzer using tools such as LEX. Generation of parser using tools such as YACC. Creation of Abstract Syntax Tree. Creation of Symbol tables. Semantic Analysis. Generation of target code.

Total Hours: 56 Hrs

CS3092 OPERATING SYSTEMS LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Linux shell programming, Inter process communication, system call implementation, multiprogramming, implementation of TLB, file system implementation, synchronization primitives, networking

Total Hours: 56 Hrs

CS3093 NETWORKS LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Introduction to socket programming, TCP and UDP Sockets, Concurrency, Multitasking, I/O multi tasking, advanced sockets, Firewall packages, Emulator and Simulator.

Total Hours: 56 Hrs

CS3094 PROGRAMMING LANGUAGES LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Introduction to functional programming, Interpreter for the language of untyped arithmetic expressions. Interpreter for the language of Untyped Lambda Calculus, Interpreter for the language of Typed arithmetic expressions. Interpreter for Simply Typed Lambda Calculus and its extensions.

Total Hours: 56 Hrs

CS3095 DATABASE MANAGEMENT SYSTEMS LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Programming exercises covering Postgres SQL, PHP, servlets, JDBC, Web enabled database applications.

Total Hours: 56 Hrs

CS3096 COMPUTATIONAL INETELLIGENCE LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

State Space Search, Two agent Games, Resolution, Machine Learning.

Total Hours: 56 Hrs

CS3097 WEB PROGRAMMING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Web client – server implementation. Concurrency and performance evaluation. Peer to peer programming and scalability issues. Developing a complete web application.

Total Hours: 56 Hrs

CS4091 BIOCOMPUTING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Familiarization with biological databases, Retrieving and analyzing data, Study on sequence alignment tools, Study on PHYLIP package, Introduction to Bio-programming with BioPerl, BioPython and BioJava, Study of Genscan, Familiarization with molecular visualization tools, Study of protein structure prediction tools, Implementation of algorithms in sequence analysis, protein structure prediction and phylogenetic tree building.

Total Hours: 56 Hrs

CS4092 DATA MINING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Experiments based on Classification, clustering, Association rule mining and feature selection. Introduction Scilab and Weka.

Total Hours: 56 Hrs

CS4093 IMAGE PROCESSING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:

Lab1: An introduction to digital images- sampling, quantization,
Lab2: Basic image processing, arithmetic processing
Lab3: Image enhancement and point operation-
Lab4: Image enhancement and spatial operation-
Lab5: Color images and models
Lab6: Frequency domain operations.

Total Hours: 56 Hrs

CS4094 COMPUTER VISION LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
MatLab implementation for the following:
Edge operations. Segmentation: by clustering, segmentation by fitting models-Vision applications.
Colouring techniques, Pseudo-colouring. Colour image analysis. Object detection and classifications.
Computation of 3D scene from 2D.

Total Hours: 56 Hrs

CS4095 COMPUTER GRAPHICS LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
OpenGL programming – drawing geometric primitives – transformations and projections – rendering meshes – rendering shadows and texture models.

Total Hours: 56 Hrs

CS4096 SOFTWARE ENGINEERING LABORATORY

Pre-requisite: CS3004 Software Engineering

L	T	P	C
1	0	3	3

Brief Syllabus:
Software development in small groups as a solution to a problem or a product to meet a certain specification. Deliverables include project plan, requirements specification document, design document and review documents. A demo of the integrated software - Review of the process with analysis of variations.

Total Hours: 56 Hrs

CS4097 OBJECT ORIENTED PROGRAMMING LABORATORY

Pre-requisite: Nil

L	T	P	C
1	0	3	3

Brief Syllabus:
Introduction to object oriented design - Implementation of programs involving OO concepts – Interfaces Implementation - UML.

Total Hours: 56 Hrs