Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Introduction

The Department of Computer Science & Engineering started functioning from 2007. It offers four year B.Tech degree course in Computer Science & Engineering. The initial intake in 2007 was 40. The degree is awarded after completion of a minimum of 200 credits. Common courses for 50 credits are offered to students of all branches in a common first year spread over 2 semesters. Courses for the remaining 150 credits are offered to students during a span of three years spread over 6 semesters.

The first Board of Studies (BoS) meeting of the B.Tech Computer Science & Engineering Course was held in May 2008. In the meeting courses to be taught at 3^{rd} and 4^{th} Semester level were only approved.

The second Board of Studies (BoS) was held on November 2009. In this meeting course scheme of B.Tech Computer Science & Engineering degree course from 3^{rd} to 8^{th} Semesters was prepared, examined, revised, formulated and approved. The scheme of courses has been designed such that at least 50% of the courses are offered by Department of Computer Science & Engineering. The remaining 50% courses are interdisciplinary and are offered by Departments of Information Technology, Department of Electronics & Communication Engineering, Electrical Engineering, Mathematics & Humanities.

Other main features of the scheme are:-

1. Courses offered are either 2 credit, 3 credit or 4 credit
2. One hour lecture/tutorial has been assigned 1 credit weightage
3. Two hour laboratory per week has also been assigned 1 credit weightage
4. A continuous evaluation scheme is used to evaluate the students for each course. The evaluation is as under:

Minor Exam I	20 marks
Minor Exam II	20 marks
Assignments	10 marks
Major Exam	50 marks

5. Grades are allotted to the students as per the following scheme:

Marks	Grades	Points
0 to 20	F	2
21 to 30	D	3
31 to 39	D^+	4
40 to 50	C	5
51 to 60	C^+	6
61 to 70	B	7
71 to 80	B^+	8
81 to 90	A	9
91 to 100	A^+	10

6. At the end of each semester a cumulative grade point average (CGPA) is calculated for the courses taken by a student.

National Institute of Technology Srinagar

Hazratbal, Srinagar, Kashmir, 190 006. India

Computer Science & Engineering Department

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2ND SEMESTER

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: PROGRAMMING & PROGRAMMING METHODOLOGY

L T P Course No. ECE 302 Credits: 4
3 1 0 Deptt: Computer Science & Engineering

Course Details:

Introduction to C Programming	Engineering problem solving methodology, computer languages, History of C, High-level languages, A simple C Program.
C-Programs	Program structure, constants and variables, scientific notation, memory concepts, Assignment statements.
Steps in Programming	Numeric data types, symbolic constants, arithmetic operators, priority of operators, Mathematical functions.
Making Decisions	The decision making process, Arithmetic comparisons, logical expressions, Algorithms, Pseudocode, control structures. *If* Selection structure, *if/else* Selection structure, *while* repetition structure, formulating Algorithms, Assignment operators, Nested *If* statements.
C Program Control	Essentials of Repetition, Counter-Controlled Repetition, *for* repetition structure, *for* structure, *Switch* multiple-selection structure. *Do/while* repetition structure, *break* and *continue* statements, logical operators.
Functions	Program modules, Math library functions, Functions, Function definition and prototypes, header files, calling functions, random number generation.recursion.
Loops	The increment and decrement operators, for loop revisited, the do-while loop, designing a problem: problem, analysis, solution.
Arrays and Matrices	Programs without arrays, using arrays, arrays and addresses, multi-dimensional arrays, storing arrays, searching arrays.
Introduction to Pointers	A first look at pointers, declaring pointers, using pointers, naming pointers, pointer operators, pointer expression and pointer arithmetic.
Arrays and Pointers	Arrays and pointers in practice, multidimensional arrays, and pointers, accessing array elements, dynamic memory allocation – The malloc() function.
Characters and Strings	Fundamentals of strings and characters, character handling library, string conversion function, standard I/O library function, comparison, search and memory function of string, Files.

Text Books
C How to Program, Deitel & Deitel, Prentice hall
Let us C, Yashavant kanetkar, BPB Publications
Reference Books
Problem solving and program design in C, Hanly, Prentice Hall
Engineering Problem Solving with ANSI C, Delores M. Etter, Prentice Hall
C Programming, Ivor Horton, Wrox Press Limited
Programming with C, Byron S. Gottfried, Tata McGraw
Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill

National Institute of Technology Srinagar

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BATCH 2007

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar

Course Structure for B.Tech Computer Science & Engineering

(Batch 2007)

Sem: 3rd

S.No.	Subject	Code	L T P	Credits	Remarks
1	Electronics Devices & Circuits		**3 1 0**	**4**	
2	Electronics Devices & Circuits - Lab		**0 0 2**	**1**	
3	Discrete Structures		**3 1 0**	**4**	
4	Object Oriented Programming		**3 1 0**	**4**	
5	Object Oriented Programming - Lab		**0 0 2**	**1**	
6	Electrical Circuit Analysis		**3 1 0**	**4**	
7	Electrical Circuit Analysis - Lab		**0 0 2**	**1**	
8	Colloquium		**0 2 0**	**2**	
9	Internet & Web Design		**1 0 4**	**3**	
	Total		**13 6 10 = 29**	**24**	

Sem: 4th

S.No.	Subject	Code	L T P	Credits	Remarks
1	Digital Electronics & Logic Design	ECE 403	**3 1 0**	**4**	
2	Digital Electronics & Logic Design - Lab	ECE 404 P	**0 0 2**	**1**	
3	Data Structures		**3 1 0**	**4**	
4	Data Structures - Lab		**0 0 2**	**1**	
5	Control Systems		**3 0 0**	**3**	
6	Automation Tools		**1 0 2**	**2**	
7	Communication Systems	ECE 408	**3 1 0**	**4**	
8	Communication Systems - Lab	ECE 409 P	**0 0 2**	**1**	
9	Introduction to Probability Theory & Statistics	MTH 403	**3 1 0**	**4**	
	Total		**16 4 08 = 28**	**24**	

Semester: 5th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Computer Organization & Architecture	CSE 501	**3**	**1**	**0**	**4**	
2	Data Base Management Systems	IT 501	**3**	**1**	**0**	**4**	
3	Data Base Management Systems - Lab	IT 502P	**0**	**0**	**2**	**1**	
4	Data Communication	ECE 506	**3**	**1**	**0**	**4**	
5	Design & Analysis of Algorithms	CSE 502	**3**	**1**	**0**	**4**	
6	Operating Systems	CSE 503	**3**	**1**	**0**	**4**	
7	Microprocessor	CSE 504	**3**	**1**	**0**	**4**	
8	Microprocessor - Lab	CSE 505 P	**0**	**0**	**2**	**1**	
	Total		**18**	**6**	**4 = 28**	**26**	

Semester: 6th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Artificial Intelligence	CSE 601	**3**	**1**	**0**	**4**	
2	Artificial Intelligence - Lab	CSE 602P	**0**	**0**	**2**	**1**	
3	Computer Networks	CSE 603	**3**	**1**	**0**	**4**	
4	Computer Networks - Lab	CSE 604P	**0**	**0**	**2**	**1**	
5	Theory of Computation	CSE 605	**3**	**1**	**0**	**4**	
6	Computer Graphics	CSE 606	**3**	**0**	**0**	**3**	
7	Computer Graphics -Lab	CSE 607 P	**0**	**0**	**2**	**1**	
8	Software Engineering	IT 603	**3**	**1**	**0**	**4**	
9	Elective I		**2**	**1**	**0**	**3**	
	Total		**18**	**5**	**4 = 27**	**25**	

Semester: 7th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Compiler Design	CSE 701	**3**	**1**	**0**	**4**	
2	Compiler Design - Lab	CSE 702P	**0**	**0**	**2**	**1**	
3	Network Security	CSE 703	**3**	**1**	**0**	**4**	
4	Network Security - Lab	CSE 704 P	**0**	**0**	**2**	**1**	
5	Pre-Project	CSE 705	**0**	**0**	**6**	**3**	
6	Seminar	CSE 706	**0**	**0**	**2**	**1**	
7	Numerical Methods	MTH 707	**3**	**1**	**0**	**4**	
8	Elective II		**3**	**1**	**0**	**3**	
9	Elective III		**3**	**1**	**0**	**3**	
	Total		**15**	**5**	**12** = **32**	**24**	

Semester: 8th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Project	CSE 801	**0**	**0**	**12**	**12**	
2	Elective IV		**3**	**1**	**0**	**4**	
3	Elective V		**3**	**1**	**0**	**4**	
4	Industrial Organization & Management	HSS 801	**3**	**0**	**0**	**3**	
5	Practical Training & Tour	CSE 808	**-**			**1**	
	Total		**9**	**2**	**12** = **23**	**24**	

List of Electives

Elective I

S.No.	Subject	Code
1	Operation Research and Optimization	MTH 611
2	VLSI Design	ECE 610
3	Simulation & Modelling	CSE 608
4	Graph Theory	CSE 609

Elective II

S.No.	Subject	Code
1	Digital Signal Processing	CSE 708
2	Multimedia Technology	CSE 709
3	Web Programming	CSE 710
4	Logic Programming	CSE 711

Elective III

S.No.	Subject	Code
1	Embedded Systems	CSE 713
2	Advanced Java	IT 712
3	System on Chip (SoC)	CSE 714
4	Advanced Internet Technologies	IT 715

Elective IV

S.No.	Subject	Code
1	Wireless Communication	CSE 802
2	Fault Tolerant Computing	CSE 803
3	Image Processing	CSE 804
4	RFIC Design	ECE 810

Elective V

S.No.	Subject	Code
1	System Design	CSE 805
2	Real Time Systems	CSE 806
3	E-commerce	IT 809
4	Unix & Shell Programming	CSE 807

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BATCH 2008 ONWARDS

Computer Science & Engineering

Department of Computer Science & Engineering
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Course Structure for B.Tech Computer Science & Engineering

(Batch 2008 onwards)

Semester: 3rd

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Electronics	ECE 303	**3**	**1**	**0**	**4**	
2	Electronics - Lab	ECE 304P	**0**	**0**	**2**	**1**	
3	Discrete Structures	MTH	**3**	**1**	**0**	**4**	
4	Object Oriented Programming	CSE 301	**3**	**1**	**0**	**4**	
5	Object Oriented Programming-Lab	CSE 302P	**0**	**0**	**2**	**1**	
6	Basic Electrical Engineering	ELE 301	**3**	**1**	**0**	**4**	
7	Basic Electrical Engineering - Lab	ELE 302P	**0**	**0**	**2**	**1**	
8	Signals & Systems	CSE 303	**3**	**1**	**0**	**4**	
9	Internet & Web Design	IT 301	**1**	**0**	**4**	**3**	
	Total		**16**	**5**	**10** = **31**	**26**	

Semester: 4th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Digital Electronics & Logic Design	ECE 403	**3**	**1**	**0**	**4**	
2	Digital Electronics & Logic Design - Lab	ECE 404 P	**0**	**0**	**2**	**1**	
3	Data Structures	CSE 401	**3**	**1**	**0**	**4**	
4	Data Structures - Lab	CSE 402P	**0**	**0**	**2**	**1**	
5	Control Systems	ELE 407	**3**	**1**	**0**	**3**	
6	Control Systems - Lab	ELE 408 P	**0**	**0**	**2**	**1**	
7	Communication Systems	ECE 408	**3**	**1**	**0**	**4**	
8	Communication Systems - Lab	ECE 409 P	**0**	**0**	**2**	**1**	
9	Introduction to Probability Theory & Statistics	MTH 403	**3**	**1**	**0**	**4**	
10	Communication Skills	HSS	**3**	**0**	**0**	**3**	
	Total		**18**	**5**	**8** = **31**	**26**	

Semester: 5th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Computer Organization & Architecture	CSE 501	**3**	**1**	**0**	**4**	
2	Data Base Management Systems	IT 501	**3**	**1**	**0**	**4**	
3	Data Base Management Systems - Lab	IT 502P	**0**	**0**	**2**	**1**	
4	Data Communication	ECE 506	**3**	**1**	**0**	**4**	
5	Design & Analysis of Algorithms	CSE 502	**3**	**1**	**0**	**4**	
6	Operating Systems	CSE 503	**3**	**1**	**0**	**4**	
7	Microprocessor	CSE 504	**3**	**1**	**0**	**4**	
8	Microprocessor - Lab	CSE 505 P	**0**	**0**	**2**	**1**	
	Total		**18**	**6**	**4** = **28**	**26**	

Semester: 6th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Artificial Intelligence	CSE 601	**3**	**1**	**0**	**4**	
2	Artificial Intelligence - Lab	CSE 602P	**0**	**0**	**2**	**1**	
3	Computer Networks	CSE 603	**3**	**1**	**0**	**4**	
4	Computer Networks - Lab	CSE 604P	**0**	**0**	**2**	**1**	
5	Theory of Computation	CSE 605	**3**	**1**	**0**	**4**	
6	Computer Graphics	CSE 606	**3**	**0**	**0**	**3**	
7	Computer Graphics -Lab	CSE 607 P	**0**	**0**	**2**	**1**	
8	Software Engineering	IT 603	**3**	**1**	**0**	**4**	
9	Elective I		**2**	**1**	**0**	**3**	
	Total		**18**	**5**	**4** = **27**	**25**	

Semester: 7th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Compiler Design	CSE 701	**3**	**1**	**0**	**4**	
2	Compiler Design - Lab	CSE 702P	**0**	**0**	**2**	**1**	
3	Network Security	CSE 703	**3**	**1**	**0**	**4**	
4	Network Security - Lab	CSE 704 P	**0**	**0**	**2**	**1**	
5	Pre-Project	CSE 705	**0**	**0**	**6**	**3**	
6	Seminar	CSE 706	**0**	**0**	**2**	**1**	
7	Numerical Methods	MTH 707	**3**	**1**	**0**	**4**	
8	Elective II		**3**	**1**	**0**	**3**	
9	Elective III		**3**	**1**	**0**	**3**	
	Total		**15**	**5**	**12** = **32**	**24**	

Semester: 8th

S.No.	Subject	Code	L	T	P	Credits	Remarks
1	Project	CSE 801	**0**	**0**	**12**	**12**	
2	Elective IV		**3**	**1**	**0**	**4**	
3	Elective V		**3**	**1**	**0**	**4**	
4	Industrial Organization & Management	HSS 801	**3**	**0**	**0**	**3**	
5	Practical Training & Tour	CSE 808	**-**			**1**	
	Total		**9**	**2**	**12** = **23**	**24**	

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4	Graph Theory	CSE 609

Elective II

S.No.	Subject	Code
1	Digital Signal Processing	CSE 708
2	Multimedia Technology	CSE 709
3	Web Programming	CSE 710
4	Logic Programming	CSE 711

Elective III

S.No.	Subject	Code
1	Embedded Systems	CSE 713
2	Advanced Java	IT 712
3	System on Chip (SoC)	CSE 714
4	Advanced Internet Technologies	IT 715

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1	Wireless Communication	CSE 802
2	Fault Tolerant Computing	CSE 803
3	Image Processing	CSE 804
4	RFIC Design	ECE 810

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1	System Design	CSE 805
2	Real Time Systems	CSE 806
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Detailed Syllabus

Semester 3rd

Computer Science & Engineering

Department of Computer Science & Engineering
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Subject: Electronic Devices & Circuits Semester: 3rd

L T P Course No. ECE 302 Credits: 4
3 1 0 Deptt: Electronics & Comm Engineering

Course Details:

Introduction to Semiconductors:

Intrinsic and extrinsic semiconductors transport mechanism of charge carriers, electric properties, Hall effect etc. Electronic Devices, their characteristics and applications, p-n junction diode. Current components in p-n junction, characteristics-piece wise linear approximation, temperature dependence, Diode capacitance, and switching times, diode circuits half wave, full wave rectifiers, clipping circuits etc. Basic operations of Zener, avalanche, schottky photo and tunnel diodes.

BJT's :
Types operation and characteristics, Ebers-Moll model, CE, CB and CC configuration input, output characteristics and graphical analysis of basic amplifier circuits, Biasing and Bias stability, Low frequency, h-parameter model, Analysis and Design of transistor amplifier circuits using h parameters. High frequency hybrid – pi model, analysis and design of transistor amplifier circuits at high frequencies. Multistage amplifiers, phototransistors, Transistor as a switch, SCR's and Thyistors.

FET's
Operation and characteristics, model Application at low and high frequency, amplifiers, switching circuits, MOSFEET TYPES, Operation and characteristics.

Cathode Ray Oscilloscope

Basic operation and measurement applications.

Books Recommended:

1. Electronic circuits by D Schelling & C Belove
2. Integrated Electronics by Millman & Halkias
3. Basic Electronics by Grob 10/e
4. Basic Electronics by Mitehel E Schultz TMH

Department of Computer Science & Engineering
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Subject: Electronic Devices & Circuits - Lab Semester: 3rd

L T P Course No. ECE 303 P Credits: 1
0 0 2 Deptt: Electronics & Comm Engineering

Course:

1. Study of CRO - Measurement of Voltage frequency and Phase of a given waveform.
2. To assemble RC circuits and observe its performance in low pass and high pass mode.
3. To assemble a series and parallel resonant circuit and observe their frequency response.
4. To measure impedance and bandwidth of a parallel tuned circuit and obtain its quality factor.
5. To measure characteristic impedance of a symmetrical Tee and Pi networks.
6. To measure image impedance of a given asymmetrical Tee & Pi network.
7. For a given two port network measure.
    i) ABCD parameters.
    ii) h - parameters.
8. To experimentally determine the characteristic impedance and to plot the attenuation
    i) characteristics of the following circuits.
    ii) Prototype low pass filter.
    ii) Prototype high pass filter.
9. To plot impedance and attenuation characteristics of following filters.
    i) Prototype band-pass filter.
    ii) m-derived LPF.
    ii) m-derived HPF
10. To obtain diode characteristics

11 a) To assemble a half wave and a full wave rectifier and to study their performance.

b) To suppress the ripple using RC filter.

12. To obtain Zener diode characteristics and to use Zener diode as a voltage regulator

13. To assemble and observe the performance of clipping and clamping circuits.

14. To obtain transistor characteristics in the following configurations:

i) Common base.

ii) Common emitter

15. To assemble a CE amplifier and observe its performance.

16. To obtain JFET characteristics and to observe performance of a source follower.

17. To illustrate use of FET as a voltage variable resistor

Department of Computer Science & Engineering
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Subject: Discrete Structures Semester: 3rd

L	T	P	Course No. MTH	Credits: 4
3	1	0	Deptt: Mathematics	

Course Details:

Sets and Propositions	Combinations of Sets, Finite and Infinite Sets, Unaccountably Infinite Sets, Mathematical Induction, Principle of Inclusion and Exclusion , Multisets, Propositions
Computability and Formal Languages	Ordered Sets, Languages, Phrase Structure Grammars, Types of Grammars and Languages
Permutations, Combinations, and Discrete Probability	The Rules of Sum and Product, Permutations, Combinations, Generation of Permutations and Combinations, Discrete Probability , Conditional Probability, Information and Mutual Information
Relations and Functions	A Relational Model for Data Bases, Properties of Binary Relations, Equivalence Relations and Partitions, Partial Ordering Relations and Lattices, Chains and Antichains, A Job-Scheduling Problem, Functions and the Pigeonhole Principle
Graphs and Planar Graph	Basis Terminology, Multigraphs and Weighted Graphs, Paths and Circuits, Shortest Paths in Weighted Graphs, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits, The Traveling Salesperson Problem
Trees and Cut-Sets	Trees, Rooted Trees, Path Lengths in Rooted Trees, Prefix Codes, Binary Search Trees, Spanning Trees and Cut-Sets, Minimum Spanning Trees
Finite State Machines	Finite State Machines, Finite State Machines as Models of Physical System, Equivalent Machines, Finite State Machines and Language Recognizers

Discrete Numeric Functions and Generating Functions	Manipulation of Numeric Functions, Asymptotic Behavior of Numeric Functions, Generating Functions, Combinatorial Problem
Recurrence Relations and Recursive Algorithms	Recurrence Relations, Linear Recurrence Relations with Constant Coefficients, Homogenous Solutions, Particular Solution
Group and Rings	Groups, Subgroups, Generators and Evaluation of Powers, Cosets and Lagrange's Theorem, Permutation Groups and Burnside's Theorem, Codes and Group Codes, Isomorphisms and Automorphisms, Homomorphisms and Normal Subgroups, Rings, Integral Domains, and Fields
Boolean Algebras	Lattices and Algebraic Systems, Principle of Duality, Basic Properties of Algebraic System, Defined by Lattices, Distributive and Complemented Lattices, Boolean Lattices and Boolean Algebras, Uniqueness of Finite Boolean Algebras, Boolean Functions and Boolean Expressions, Propositional Calculus

Textbooks:

1. Elements of Discrete Mathematics by C.L. Liu Mc Graw Hill

2. Discrete Mathematical Structures by Kolman B, Busby R. C, Ross S.C by Pearson Education

3. Discrete Mathematical Structures: Theory & Applications by D.S Malik & M.K.Sen Thomson India Edition

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Subject: Object Oriented Programming Semester: 3rd

L	T	P	Course No. CSE 301	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Introduction	Basic features & concepts of Object Oriented Programming (OOP), Benefits, Languages and Applications of OOPs.
Tokens, Expressions and Control Structures	Tokens, Keywords, Identifiers & Constants, Basic Data types, User-defined Data types, Derived Data Types, Memory Management Operators, Manipulators, Expressions, Operator Overloading, Control Structures
Functions in C++	Main function, function prototyping, call by reference, inline functions, default functions, function overloading
Classes and Objects	Specifying a class, defining member functions, private member functions, array within a class, memory allocation for objects, arrays of objects, objects as function arguments, returning objects, pointers to members, local classes
Constructors & Destructors	Constructors, Parameterized Constructors, Constructors with Default arguments, Dynamic Initialization of objects, Dynamic Constructors & Destructors
Operator Overloading & Type Conversion	Definition & Rules of overloading Operators, Overloading Binary & Unary Operators
Inheritance	Definition, single, multilevel, multiple, hierarchical and hybrid inheritance, virtual base classes, abstract classes
Pointers, Virtual Functions and Polymorphism	Pointers, Pointers to Objects and derived classes, virtual functions, Pure virtual functions
Templates	Class templates, function templates, overloading of function templates, member function templates
Strings	Creating and manipulating string objects, accessing characters in strings, comparing and swapping

Books recommended:

1. Object Oriented Programming with C++, **E Balagurusamy**
2. Object Oriented Programming in Turbo C++, **Robert Lafore**
3. Teach Yourself C++, **Al Stevens**
4. A Structured Approach using C++, **Farouzan & Gilberg**
5. Object Oriented Programming with C++, **R S Salaria**

Department of Computer Science & Engineering
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Subject: Electrical Circuit Analysis Semester: 3rd

L T P Course No. ELE 301 Credits: 4
3 1 0 Deptt: Electrical Engineering

Course contents:

Electric Circuit Laws:

Basic electric circuit terminology, Ohm's law, Kirchhoff's current law. (KCL) and Kirchhoff's voltage law (KVL) circuit parameters (Resistance, Inductance and capacitance). Series and Parallel combinations of resistance, Inductance and capacitance, Nodal analysis.

Energy Source:

Ideal and practical voltage and current sources and their transformation.

Dependent Sources:

Dependent voltage sources and dependent current sources.

D.C. Circuit Analysis:

Power and energy relations, Analysis of series parallel d.c. circuits, Delta star (Y) Transformation, Loop and Nodal methods, Thevenin's, Norton's theorem, Maximum Power transfer theorem, Superposition theorem.

A.C. Circuit Analysis:

Basic terminology and definitions, Phasor and complex number representations, solutions of sinusoidal excited, RC circuits, power and energy relations in a c circuits, Applications of network theorems to a.c. circuits, Resonance in series and parallel circuits.

Steady State A.C. Three phase Circuits:

Concept of a 3 phase voltage, wye (Y -) circuits. Delta circuits, current and voltage relations in Y and Circuits, characteristics of 3 phase systems.

Magnetically Coupled Circuits :

Mutual inductance, Theory of magnetic circuits and electromagnetism. Transformers.

Books Recommended

1. Basic Electrical Engineering by Fitzgerald

2. Electrical Engineering Fundamentals by V. Del Toro

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Electrical Circuit Analysis - Lab Semester: 3rd

L T P Course No. ELE 305 P Credits: 1
0 0 2 Deptt: Electrical Engineering

Course contents:

List of Experiments:

1. To study the colour coding of resistors
2. Connection of Ammeters, Voltmeters, Wattmeters and multi-meters in DC and AC circuits and selection of their ranges.

3 Use of LCRQ meter.

4. To study the series / parallel operation of resistors and verifying their effective values by LCRQ meter.

5 To verify the KVL and KCL in DC circuits.

6 To verify the star delta transformation of networks.

7 To verify the superposition theorem.

8 To verify the maximum power transfer theorem

9 Basic R, L, C circuits excited from A.C

10 To measure electric power in single-phase AC circuits with resistive load, RL load and RLC load.

11 To measure the power and power factor in three phase AC circuits.

12 To study the series resonance.

13 To study the parallel resonance.

14 To study the handling of CRO and use it for the study of different voltage waveforms.

15 Computer Aided Circuit Analysis (3 experiments)

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Internet & Web Design Semester: 3rd

L	T	P	Course No.	IT 301	Credits: 3
1	0	4	Deptt: Information Technology		

Course Details:

Computer Networks	Basics of Networks, Topologies of Networks, Layers in Networking, Layers in Networking, Switching in the Networks, Bridges, Routers and Gateways, Types of Networks
The Internet	Basics of Internet, Addresses and Names for the Internet, Web Objects, and Sites, E-Mail, World Wide Web, File Transfer, The 'Telnet", The 'Usenet',
Web Servers, Browsers, and Security	The Web Server, The Proxy Server, The Fast Ready Connections on the Web, Web Browsers, Netscape Communication Suite, Microsoft Internet Explorer, The Virus Menace in the Internet, Firewalls, Data Security,
Creating a Website and the Markup Languages (HTML, DHTML, and XML)	The Art of Creating a Website, Hypertext and HTML, HTML Document Features, Document Structuring Tags in HTML, Special Tags in HTML, Dynamic HTML, XML for a Universal Format for the Data on the Web, Microsoft Frontpage,
Searching and Web-Casting Techniques	How to Get Found or Hidden Data from Search Engines, Subscribing, Introduction, Search Engines, Search Tools,
Java Programming	Why Java? Java Programming Language, Java Classes, Constructors, Java Object and their Creation, Inheriting Members from Another Class, Interfacing Methods from Other One or More Classes, Abstract Class (or Super Class) for One or More Subclasses, Data Encapsulation, Inner Classes within a Class, Multiple Threads,
Java IO	Java IO input Streams and Output Streams for Bytes, Java IO Character Stream Related Reader and Writer Classes, Java IO

	File Related Classes,
Java Components	Human Computer Interface and Windows Environment, Creating a GUI, Applets, Various Ways of Event Handing in Components and Applets, Javabeans, CORBA and EJBs,
Network and Security Programming Using Java	Network Programming, URL Classes, Socket Classes, Programming for Security,
The Dynamic Functionality in Web Pages	CGI, Four Steps for a CGI Script Communication, CGI Script Languages, A Scripting Language-'JavaScript', Dynamic Page Functionality Using Servlets and JSPs, Dynamic Page Functionality Using ASPs, COMs, DCOMs and ASP,

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Signals & Systems **Semester: 3rd**

L	T	P	Course No. CSE 303	Credits: 4
3	1	0	Department: Computer Science & Engg	

Course Details:

Introduction to signals:

Classification of signals; Deterministic and non-deterministic, periodic and aperiodic, even and odd signals, energy and power signals, elementary signals; exponential, sinusoidal, impulse, step, ramp, pulse, square wave signals. Time shifting, time scaling and time-inversions of signals

Linear Time invariant systems

Continuous time system, basic system properties like causality, time invariance, stability, linearity, memory, order of system, interconnection of systems, Linear time invariant systems, characterization, unit impulse response , convolution, properties of LTI systems, linear constant co-efficient differential equations and system description.

Fourier analysis of signals and systems

Fourier series of periodic signals and its properties, Fourier transform of aperiodic signals and its properties, fourier transform of periodic signals, convolution in time and frequency domain, energy and signals, parsevals theorem, energy spectral density and its properties, Transfer function of LTI system

The Laplace Transform

Definition, relation between Laplace and Fourier transforms, region of convergence, properties of Laplace transform, initial and final value theorems, convolution, transfer function of LTI system, concept of poles and zeroes, stability criteria

Random variable theory and random signals

Probability, conditional probability, statistical independence, random variables, discrete and continuous random variables, probability distribution and probability density functions, statistical averages of random variables. Some important density functions.

Random processes and characterization

Ensemble and time averages, stationary and non-stationary random process, wide sense stationery random process, autocorrelation and cross-correlation functions, response of LTI systems to random inputs, noise and its types, white noise, signal to noise ratio of LTI systems.

Books Recommended:

(1) Signals and Systems by Zieman, Tranter, Fannin
(2) Signals and Systems by Sanjay Sharma
(3) Signals and Systems by A Populis
(4) Random processes and Systems by A Populis
(5) Signals and Systems by S. Hykin

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Detailed Syllabus

Semester 4th

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Digital Electronics & Logic Design Semester: 4th

L T P Course No. :ECE 403 Credits: 4
3 1 0 Deptt.: Computer Science & Engineering

Course Contents:

Binary Systems	Number Systems (binary, octal, hexadecimal), conversion from one system to another, complements and codes
Boolean algebra & Logic Gates	Basic Definitions, Theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Logic Operations & Gates
Simplification of Boolean Functions	Map Method and Tabulation Method (2, 3, 4, 5, 6 variables)
Combinational Logic	Design Procedure, Arithmetic and Arithmetic Circuits
Combinational Logic with MSI & LSI	Parallel Adder/ Subtractor, Decoders, Multiplexers, ROMs, PLA's
Sequential Logic	Flip-Flops (FF), Triggering, Analysis, State Reduction & Assignment, FF Excitation Tables, ASM Charts, Design Procedure, Design of Counters, Design with State Equations
Registers, Counters	Shift Registers, Synchronous Counters

Data Conversion	ADC, DAC
VHDL Programming	Introduction, Code Structure, Data Types Operators & Attributes, Concurrent Code, Sequential Code, Signals & Variables, State Machines, Circuit Designs

Recommended Books:

1. Digital Logic & Computer Design, M Morris Mano, PHI.
2. Digital Electronics, Gupta & Singhal, Katson Books.
3. Circuit Design with VHDL, V A Pedroni.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Digital Electronics & Logic Design - Lab Semester: 4th

L T P Course No. :ECE 404P Credits: 1

3 1 0 Deptt.: Computer Science & Engineering

List of Experiments for Lab:

Hardware	Logic Gates, All Combinational Logic circuits to be implemented using IC Trainer kits or IC's and Bread Board
Software	VHDL Programs for Combinational Logic and Sequential Logic Circuits using Xilinx

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Data Structures **Semester: 4th**

L T P Course No. : Credits: 1

3 1 0 Deptt.: Computer Science & Engineering

Introduction	Basic concept of data, structures and pointers.
Arrays	Representation, implementation, polynomial representation. Limitations.
Strings	Representation, String operations, Implementing String.h library functions.
Linked List	Static and dynamic implementation. Single, double, circular, multiple linked lists.
Stacks	Recursion and Stacks. Static and dynamic implementation. Expression evaluation. Infix, postfix expressions, multiple stacks.
Queues	Static and dynamic implementation, circular queues, and implementation.
Hash Tables	Hash tables implementation. Hashing techniques, single, double.
Storage Management	Memory Management techniques, garbage collection.
Trees	Binary trees, binary search trees, static and dynamic implementation. Tree operations, insert, delete, and search.
Heaps	Implementation, sorting etc.
Sorting and Searching	Different sorting techniques. Insertion sort, selection sort, bubble sort, radix sort, quick sort, merge sort, heap sort.
Graphs	Representation of graphs, BFS, DFS sort.

Books Recommended:

1. Data Structures by Rajni Jindal
2. Data Structures - Schaum's Series
3. Data Structures by Knuth
4. Data Structures by Farouzan

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Data Structures – Lab Semester: 4th

L T P Course No. : Credits: 1

3 1 0 Deptt.: Computer Science & Engineering

Lab Contents:

Introduction: Basic concepts of data, linear lists, strings, arrays and orthogonal lists, representation of trees & graphs, storage systems

Arrays, Recursion, Stacks, Queues, Linked lists

Binary trees, General Trees, Tree Traversal

Symbol Table and Searching Techniques

Sorting Techniques, graphs.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Control Systems **Semester: 4th**

L	T	P	Course No. ELE 407	Credits: 3
3	1	0	Department: Electrical Engineering	

Course Details:

Introduction to linear Control System:
Control Systems, types of control systems, feedback and its effects, mathematical modeling of physical systems.

System Representations:
Block diagrams, transfer functions, signal flow graphs, polar and Bode plot representation of loop gains of control systems.

Time Domain Analysis of Control Systems:
Typical test signals for time response of control systems, time domain performance of first and second order control systems (steady state response and transient response), P I D Controllers.

Stability of Control Systems:
Stability characteristic equation, state transition matrix, stability of linear time invariant systems, Rough-Hurwitz Criterion, Nyquist criterion, Root locus plot, Bode diagrams.

Frequency Domain Analysis of Control Systems:
Frequency domain characteristics second order systems relative stability, graphic methods of determining gain margin and phase margin, Nichols chart.

Introduction to Modern Control Theory:
State Equations, State Transition Matrix, State transition equations, State Diagrams, concept of controllability and observability.

Books Recommended:

1. Modern Control Systems by Ogatta
2. Automatic Control systems by B C Kuo

Department of Computer Science & Engineering

National Institute of Technology, Srinagar.

Subject: Control Systems - Lab **Semester: 4th**

L	T	P	Course No. ELE 408 P	Credits: 1
0	0	2	Department: Electrical Engineering	

List of Experiments:

1. To study the performance of Relay control Combination of P,I and D control schemes in a typical thermal system.(oven)
2. To study the torque-speed characteristics of an AC servomotor.
3. To study the time response of a variety of simulated linear systems.
4. To study the role of feedback in a DC speed control system.
5. To study the role of feedback in a DC position control system.
6. To study the role of a combination of P,I and D control actions in a variety of simulated linear systems.
7. To study the computer simulation of a number of systems.
8. Use of MATLAB / SIMULINK /Control System tool boxes.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Communication Systems Semester: 4th

L	T	P	Course No. ECE 408	Credits: 4
3	1	0	Deptt: Electronics & Comm Engineering	

Course Details:

Special analysis of Signals:
Fourier series of repetitive signals, Fourier transform of non-repetitive signals, Amplitude spectrum of special signals viz., pulse train and pulse waveform.

Modulation:
AM, DSB/SC, SSB, VSB, Angle modulation, NBFM, WBFM, Diode detector, Frequency discriminator, AM & FM, Transmitter.

Demodulation:
AM and FM signals, Radio Receivers – AM & FM (Block diagram)

Noise Analysis:
Performance of AM & FM Systems, in presence of noise Threshold in AM & FM, Demodulation, pre emphasis and De emphasis, in FM Systems.

Digital Communication:
Sampling, Quantization, quantization noise, Coding, Pulse code Modulation; differential PCM, ADPCM, Relative advantages and dis-advantages. Delta modulation, PWM & PPM.

Digital Modulation Techniques:
ESK,FSK, M-FSK, DPSK, GPSK Schemes.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Communication Systems - Lab Semester: 4th

L	T	P	Course No. ECE 409P	Credits: 4
3	1	0	Deptt: Electronics & Comm Engineering	

Lab Details:

i) Generation and detection of amplitude modulated signals.

ii) Generation and detection of frequency modulated signals.

iii) To measure sensitivity, selectivity, and fidelity of a radio receiver.

iv) To generate PAM and PDM signals using IC 555.

v) To test a pulse code modulator.

vi) To measure the noise figure of the following systems:-

A.M. System.

F.M. System.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Introduction to Probability & Statistics Semester: 4th

L	T	P	Course No. :MTH 403	Credits: 4
3	1	0	Deptt.: Mathematics	

Statistics and probability:

Measures of Central tendency and Measures of Variations (Dispersions), Moments, Measures of skewness and kurtosis.

Random experiment, sample space, Events, Classical statistical and Axiomatic Definitions of Probability. Statements and proof of theorems on addition and multiplication of probabilities. Simple problems.

Baye's theorem on conditional probability. Random Variables, Derivation of formulae for mean, Variance and moments of random variables for discrete and continuous cases.

Laws of expectation, Binomial, Poisson and normal Distributions, Beta and gamma Distribution, t-distribution, F-Distribution, Chi-square Distribution and their applications.

Methods of least squares, fitting a straight line and parabola of Degree 'p'. Regression and correlation. Multiple and partial correlation.

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Detailed Syllabus

Semester 5th

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Computer Organization & Architecture **Semester: 5th**

L	T	P	Course No. CSE 501	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Introduction: Overview of basic digital building blocks; basic structure of a digital computer.

Number system and representation of information, arithmetic and logical operation, hardware implementation, Real numbers - fixed and floating point, IEEE754 representation.

Basic building blocks for the ALU: Adder, Subtractor, Shifter, Multiplication and division circuits.

CPU Subblock: Datapath - ALU, Registers, CPU buses; Control path - microprogramming (only the idea), hardwired logic; External interface. Various addressing modes. Concept of sub-routine and sub-routine call. Use of stack for handling sub-routine call and return, instruction interpretation and execution.

Memory Subblock: Memory organization; concepts of semi-conductor memory, CPU memory interaction, organization of memory modules, cache memory and related mapping and replacement policies, virtual memory.

I/O Subblock: I/O techniques - interrupts, polling, DMA; Synchronous vs. Asynchronous I/O; Controllers.

Introduction to VHDL concepts: examples to be taken up from the rest of the course for implementation.

Books recommended:

1. Computer Organization, **Hamachar, Vranesic & Zaky.**
2. Circuit Design with VHDL, **Volnei Pedroni**.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Data Base Management systems **Semester: 5th**

L	T	P	Course No. IT 501	Credits: 4
3	1	0	Deptt: Information Technology	

Course details:

Introduction: Purpose, data abstraction, data models, object based models, record based logical models, physical data model

Relational Database Design: Normalization – 1NF, 2NF, 3NF, BCNF, higher Normal forms, De-normalization

Query Processing: Overview, General Strategies, Query Representation, Query Transformation, Catalog information, Estimated size of relations, Measures of query cost, selection, sorting, Join & other operations, query evaluation & choice of evaluation plans.

Object Oriented & Object Relational Databases: New Applications, limitations due to 1NF, the object oriented Data model, nested relational model, querying with complex types, comparison of object-oriented & object relational databases.

Books Recommended:

1. R. El. Masri and S. B. Navathe. *Fundamentals of Data Base Systems*, Benjamin Cummings, 1989.
2. H. F. Korth and A. Silberschatz. *Database Concepts*, 2nd Edition, Mcgraw Hill, 1991.
3. J. D. Ullman. *Principles of Database and Knowledge Base Systems*, Vol. I & II, Computer Science Press, 1988.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Data Base Management Systems-Lab **Semester: 5th**

L	T	P	Course No. CSE 502 P	Credits: 1
0	0	2	Deptt: Information Technology	

The student will be exposed to database access techniques using an interactive approach. This approach will use Industry Standard Structured Query Language (SQL) to maintain tables to answer queries and maintain data using single tables and multiple table joins.

The student would have to develop and write SQL queries that will

1. Extract data from a single table
2. Use predicates and operators
3. Use SQL functions
4. Add, change and remove data in a data base
5. Manage database transactions
6. Create and manage tables and other data base objects
7. Control access to data
8. Join together data items from multiple tables
9. Use sub-queries for selection of data
10. Perform summery analysis

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Data Communication **Semester: 5th**

L	T	P	Course No. ECE 503	Credits: 4
3	1	0	Deptt: Electronics & Communication Engg	

Course Contents

- **Data and Signals:** Data, Signals, Types of Signals, Bandwidth, spectrum, Digitization of analog signals, sampling, Nyquist sampling theorem, quantization, quantization noise, Pulse code modulation
- **Digital modulation Techniques:** ASK, FSK, PSK, DPSK, M-ary PSK, QAM. Signal constellation.
- **Line coding techniques:** NRZ, RZ, Biphase, Manchester coding, AMI, HDBn
- **Transmission media:** Guided and un-guided media, twisted wire pair, co-axial cable, optical fibre, microwave links, satellite microwave link, their characteristic features and applications for data transmission.
- **Data transmission:** simplex, half duplex and full duplex, Asynchronous and synchronous data transmission. Carrier, bit and frame synchronization techniques, Phase lock loop.
- **Multiplexing Techniques:** Frequency Division Multiplexing, Time Division Multiplexing, Wavelength division Multiplexing and Code Division Multiplexing. Spread Spectrum.
- **Errors in data communication:** Types of errors, error detection and correction techniques, forward error correction, polynomial error detection scheme, computation of CRC. Hardware
- **Data communication network**: Basic concept of network, Advantages and applications, Types of networks (LAN, MAN and WAN), Different network topologies like star, ring, hybrid, tree.

Books recommended

(i) William Stallings: Data & Computer Communications, 7th Ed, PHI
(ii) Andrew Tanenbaum, "Computer Networks" PHI
(iii) Sklar, "Digital Communications fundamentals & Applications" 2nd Ed Pearson Pub.
(iv) Keizer, " Local Area Networks" McGraw Hill

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Design & Analysis of Algorithms **Semester: 5th**

L	T	P	Course No. CSE 502	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Introduction: Algorithm Design paradigms- motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptomatic Notations.

Divide & Conquer: Structure of divide and conquer algorithms: examples, Binary search, Quick sort, analysis of divide and conquer run time reference relations.

Greedy method: Overview of the greedy paradigm, examples of exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), single source shortest paths.

Dynamic Programming: Overview, difference between dynamic programming and divide and conquer, applications: shortest path in graph, matrix multiplication, travelling salesman problem, longest common sequence.

Graph searching and traversal: Overview, traversal methods, depth first and breadth first search.

Back Tracking: Overview, 8-queen problem and Knapsack problem.

Branch & Bound: LC searching, bounding, FIFO branch and bound, Applications: 0/1 Knapsack problem, Travelling salesman problem.

Computational complexity: Complexity measures, Polynomial vs non-polynomial time complexity; NP hard and NP complete classes, examples

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Operating System **Semester: 5th**

L	T	P	Course No. CSE 503	Credits: 4
3	1	0	**Deptt:** Computer Science & Engineering	

Course contents:

Introduction: Operating system and function, Evolution of operating system, Batch, Interactive, Time Sharing and Real Time System, System protection.

Operating System Structure: System Components, System structure, Operating System Services.

Concurrent Processes: Process concept, Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Classical problems in Concurrency, Inter Process Communication, Process Generation, Process Scheduling.

CPU Scheduling: Scheduling Concept, Performance Criteria Scheduling Algorithm, Evolution, Multiprocessor Scheduling.

Deadlock: System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from deadlock combined approach.

Memory Management: Base machine, Resident monitor, Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Organization, Impact on performance.

I/O Management & Disk Scheduling: I/O devices and organization of I/O function, I/O Buffering, DISK I/O, Operating System Design Issues.

File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues.

Books and References:

1 J. Peterson, A. Silberschatz, and P. Galvin. *Operating System Concepts*, Addison Wesley, 3rd Edition, 1989.
2 M. J. Bach. *Design of the Unix Operating System*, Prentice Hall of India, 1986.
3 A. Silberschatz and P. Galvin. *Operating System Concepts*, Addison Wesley, 4th Edition, 1994.

Department of Computer Science & Engineering
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Subject: Microprocessor **Semester: 5th**

L	T	P	Course No. CSE 504	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course details:

I. Microcomputer Structure and Operations

Basic Microcomputer Elements, Typical Microcomputer Structure, CPU, Memory System, Input Output

Microprocessors and Memory:
Typical 8, 16 and 32 bit Microprocessors,8085 Microprocessor Specification, Memory Technologies

II. Assembly Language Programming

Programming Model of 8085, Registers, Fetch, Execute Operation of CPU, Instruction SetAddressing Modes, Basic Operations, Microprocessor Arithmetic, Program Flow, Control Using Looping and Branching. Stack, Subroutines, Interrupts, Resets

III. Bus System

System Bus Structure, Bus Operations, Cycle by Cycle Operations, Timing and Control, Priority Management, Address Decoding

IV. Microprocessors Interfacing

Interfacing concepts, Parallel Input Output, Memory Interfacing, Direct Memory Access. The Serial Subsystems. Programmable Peripheral Interface, Analog Converter Subsystem

V. Introduction to 8086 architecture.

Main features and addressing modes.

V. Latest Developments in Microprocessor Technology

Books recommended

1. Microprocessor by Goankar
2. Microprocessor by Douglas Hall

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Microprocessor - Lab Semester: 5th

L	T	P	Course No. CSE 505 P	Credits: 1
0	0	2	Deptt: Computer Science & Engineering	

Course:

i) To develop a program to add two double byte numbers.
ii) To develop a subroutine to add two floating point quantities.
iii) To develop program to multiply two single byte unsigned numbers, giving a 16 bit product.
iv) To develop subroutine which will multiply two positive floating point numbers.
v) To write program to evaluate P* Q*+R* & S are 8 bit binary numbers.
vi) To write a program to divide a 4 byte number by another 4 byte number.
vii) To write a program to divide an 8 bit number by another 8 bit number upto a fractional quotient of 16 bit.
viii) Write a program for adding first N natural numbers and store the results in memory location X.
ix) Write a program which decrements a hex number stored in register C. The Program should half when the program register reads zero.
x) Write a program to introduce a time delay of 100 ms using this program as a subroutine display numbers from 01H to OAH with the above calculated time delay between every two numbers.
xi) N hex numbers are stored at consecutive memory locations starting from X. Find the largest number and store it at location Y.
xii) Interface a display circuit with the microprocessor either directly with the bus or by using I/O ports. Write a programme by which the data stored in a RAM table is displayed.
xiii) To design and interface a circuit to read data from an A/D converter, using the 8255 A in the memory mapped I/O.
xiv) To design and interface a circuit to convert digital data into analog signal using the 8255 A in the memory mapped I/O.
xv) To interface a keyboard with the microprocessor using 8279 chip and transfer the output to the printer.
xvi) To design a circuit to interface a memory chip with microprocessor with given memory map.

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Detailed Syllabus

Semester 6th

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Artificial Intelligence Semester: 6th

L	T	P	Course No. CSE 601	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Introduction to AI. Agents and environments. Problem solving by search; uninformed search, informed ("heuristic") search, constrained satisfaction problems, adversarial search, Knowledge representation and reasoning; rule based representations, logical formalisms, frames or object oriented systems, network based approaches and mixed representations. Theorem-proving. Knowledge bases and expert systems.

Overview of LISP and PROLOG. Reasoning in uncertain environments. Planning communication and multiagent systems. Learning. Vision. Natural Language Processing. Neural nets, non-monotonic logic, various case studies.

Books and References:

1. Charniak and Mcdermott. *Introduction to Artificial Intelligence*, Addison-Wesley, 1985.
2. Ginsburg. *Essentials of Artificial Intelligence*, Morgan Kaufmann, 1993. Winston. *Artificial Intelligence*, 3rd Edition, Addison Wesley, 1992.
3. Elaine Rich, Artificial Intelligence, PHI.

Subject: Artificial Intelligence Semester: 6th

L	T	P	Course No. CSE 602P	Credits: 1
0	0	2	Deptt: Computer Science & Engineering	

The laboratory will emphasize the use of PROLOG, LISP, CLOS (Common Lisp Object Systems), Expert System Shells, tools from public domain, and in-house work.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Computer Networks Semester: 6th

L T P Course No. CSE 603 Credits: 4
3 1 0 Deptt: Computer Science & Engineering

Course Details:

- Basic concept of network, Advantages and applications, Types of networks (LAN, MAN and WAN), Different network topologies like star, ring, hybrid, tree.
- **Network Protocol Architecture**: OSI Reference model, Layers of the OSI model. Physical, Data-link, Network, Transport, Session, Presentation and Application layer.
- **Network Switching Techniques:** Circuit switched, message switching and packet switched networks, Datagram and virtual circuit services, Frame relay, ATM
- **Flow and Error Control:** Stop and wait flow control, Sliding window flow control, error control protocols, ARQ techniques, Stop-&-wait ARQ, Go back by N ARQ, Selective repeat ARQ.
- **Routing algorithms:** Routing tables, features of a routing algorithm, classification, optimality principle, sink tree, shortest path algorithm, Dijkstra algorithm, flooding, fixed routing, random routing, adaptive routing, distance vector and link state algorithm.
- **Congestion Control:** Congestion in networks and quality of service.
- **Medium Access Control Protocols**: TDMA, FDMA, CDMA, ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Ethernet, Token Ring network
- **Network security:** Need for network data security, plaintext, cifertext, encryption techniques, substitution, transposition, DES encryption standard, Private key, public key, Authentication.

Internetworking and Internet fundamentals:

- Network Interconnections, Bridges, Routers, Internet Concepts, Brief concepts about common Channel signaling and Integrated Digital Networking.

Books recommended

(v) William Stallings: Data & Computer Communications, 7th Ed, PHI
(vi) Andrew Tanenbaum, "Computer Networks" PHI
(vii) Sklar, "Digital Communications fundamentals & Applications" 2nd Ed Pearson Pub.
(viii) Keizer, " Local Area Networks" McGraw Hill

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Computer Networks - Lab Semester: 6th

L	T	P	Course No. CSE 604P	Credits: 4
0	0	2	Deptt: Computer Science & Engineering	

Lab Contents:

Experiments to support study of the Internet protocol stack:

a) Experimental study of application protocols such as HTTP, FTP, SMTP, using network packet sniffers and analyzers such as Ethereal. Small exercises in socket programming in C/C++/Java.

b) Experiments with packet sniffers to study the TCP protocol. Using OS (netstat, etc) tools to understand TCP protocol FSM, retransmission timer behavior, congestion control behaviour.

c) Introduction to ns2 (network simulator) - small simulation exercises to study TCP behavior under different scenarios.

d) Setting up a small IP network - configure interfaces, IP addresses and routing protocols to set up a small IP network. Study dynamic behaviour using packet sniffers

e) Experiments with ns2 to study behaviour (especially performance of) link layer protocols such as Ethernet and 802.11 wireless LAN.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Theory of Computation Semester: 6th

L T P Course No. CSE 605 Credits: 4
3 1 0 Deptt: Computer Science & Engineering

Course Details:

Introduction: Complexity of computations, automata , computability, complexity, mathematical notions and terminology, definitions, theorems and proofs, types of proofs

Automata & Languages: Finite Automata, Non-determinism, regular expressions, non-regular expressions

Context free languages: context free grammar, pushdown automata, non-context free languages, equivalences, closure properties, concepts in parsing,

Computability theory: turing machines, variants of turing machines, the definition of algorithm

Decidability, reducibility, advanced topics in computability theory- recursion theorem etc.

Complexity theory- time complexity, space complexity, intractability

Books Recommended:

1. C. Papadimitrou and C. L. Lewis. *Elements of Theory of Computation* , Prentice-Hall, 1981.
2. J.E. Hopcroft and J.D. Ullman. *Introduction to Antomata Theory,*
3. *Languages of Computations* , Addison-Wesley, 1979. (Indian edition available from Narosa.)

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Computer Graphics Semester: 6th

L T P Course No. IT 606 Credits: 3
3 0 0 Deptt: Information Technology

Course Details:

Introduction: Co-ordinate representation, Pixel, Raster Scan & Random Scan methods, color CRT Raster scan basics, video basics, interactive devices, graphics input and output devices, mouse, track ball, light pen, digitizer, thumb wheel, raster scan graphics.

Graphics Primitives:

Introduction to Picture Synthesis and Analysis. Conceptual Framework of an Interactive Graphical Simulation System. Graphics hardware. Basic Raster Graphics Algorithms.

Introduction to Simple Raster Graphics Package (SRGP). Graphics Entities. Geometric Transformations. Object hierarchy. Segmentation. Interaction Techniques.

Geometric Modeling in 3-D. Viewing in 3-D. Concept of Synthetic Camera. Dialogue Design. Graphics User Interfaces. Windowing Systems.

Graphical Modeling of Discrete events. Simulation of Discrete Event Displays. Animation Techniques. Basic Rules for Animation. Graphical Simulation of continuous motion.

Role of Virtual Reality in Graphical Simulation.

Books and References:

1. Newman & Sproul, Principles of Interactive Computer Graphics.
2. James D. Foley, Andries VanDam, Feiner Steven K. and Hughes John F. *Computer Graphics: Principle and Practice,* Addison-Wesley Publishing House.
3. Foley and VanDam. *Fundamentals of Interactive Computer Graphics,* Addison-Wesley.
4. Rogers D. F. *Procedural Elements of Computer Graphics,* McGraw Hill.
5. Dennis Harris. *Computer Graphics and Applications,* Hearn and Baker.
6. *Computer Graphics,* Prentice Hall of India.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Software Engineering Semester: 6th

L T P Course No. IT 603 Credits: 4
3 1 0 Deptt: Information Technology

Course Details:

Introduction: What is software Engineering? Professional & Ethical responsibility, emergent systems properties, systems engineering, project management

Requirements and tools; requirements engineering process system model, critical system specification, informal and formal specifications;

Design methodologies: architectural design, distributed systems design, application architectures, object oriented design, real time software design, user interface design, rapid software development, software reuse

Structural and Functional Testing: Verification and validation, software testing, critical systems validation

Models for reliability and cost: Software cost estimation, quality management, process improvement, configuration management

Security Engineering, Service oriented software engineering, aspect oriented software engineering

Books Recommended

1. Software Engineering – A practitioner's approach by Roger S Pressman.
2. Fundamentals of Software Engineering by Ghezzi, jazayeri, Mandrioli.
3. Software Engineering by Sommerville.

National Institute of Technology Srinagar

Hazratbal, Srinagar, Kashmir, 190 006. India

Detailed Syllabus

Semester 7th

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Compiler Design Semester: 7th

L	T	P	Course No. CSE 701	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns. Difficulties in lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams, LEX.

Syntax analysis: CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions.

Run time system: storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, boolean expressions and procedure calls. Implementation issues.

Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

Books and References:

1. A. V. Aho, R. Sethi, and J. D. Ullman. *Compilers: Principles, Techniques and Tools* , Addison-Wesley, 1988.
2. C. Fischer and R. LeBlanc. *Crafting a Compiler*, Benjamin Cummings, 1991.

3. C. Fischer and R. LeBlanc. *Crafting a Compiler in C*, Benjamin Cummings.
4. A. C. Holub. *Compiler Design in C*, Prentice-Hall Inc., 1993. Appel. *Modern Compiler Implementation in C: Basic Design*, Cambridge Press.
5. Appel. *Modern Compiler Implementation in Java: Basic Design,* Cambridge Press.
6. Fraser and Hanson. *A Retargetable C Compiler: Design and Implementation* , Addison-Wesley
7. Dhamdhere. *Compiler Construction*, McMillan India. Holmes. *Object Oriented Compiler Construction*, Prentice Hall.
8. Holmes. *Building your own Compiler with C++*, Prentice Hall. Wirth. *Compiler Construction*, Addison-Wesley.
9. Wilhelm and Maurer. *Compiler Design*, Addison-Wesley.

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Network Security Semester: 7th

L	T	P	Course No. CSE 703	Credits: 4
3	1	0	Deptt: Computer Science & Engineering	

Course Details:

Introduction to computer networks and network security.

Authentication and authorization overview, vulnerabilities, risk assessment, incidents, forensics. UNIX vulnerabilities and safeguards, Hash functions (MD5, SHA, RIPEM), Network security (BSDisms, sniffers, wrappers, vpns, firewalls, intrusion detection).

Kerberos, DCE.

Cryptography, steganography, number theory, random numbers. Secret key encryption (DES, IDEA, RC5, CAST, AES (Rijndael)).Public key encryption (Diffie-Hellman, RSA, ECC, DSA).

Key management, PKIs. Crypto API's. Secure applications: PGP, S/MIME, CFS, ssh, Netscape/SSL, IPsec. Issues: legal/political/ethical. Operating system security, Operating system security model, Secure security issues, Firewalls, Java security

Books Recommended:

1. Network Security by William Stallings
2. Practical Cryptography by Ferguson & Schneier
3. Applied Cryptography by Bruce Schneier

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Numerical Methods Semester: 7th

L	T	P	Course No. MTH 707	Credits: 4
3	1	0	Deptt: Mathematics	

Course Content:

Representation of Numbers. Sources of errors and their propagation.

Error analysis and the idea of conditioning.

Linear systems of equations and their solutions.

Gauss elimination and its complexity and robustness.

Well-conditioning and matrix inversion.

Gram-Schmitt orthogonalization.

Interpolation and approximation.

Divided differences.

Interpolation at increasing number of points.

Best approximation and orthogonal polynomials.

Iterative methods for root finding.

Rates of convergence.

Fixed points.

Iterative methods for linear systems.

Numerical Differentiation.

Ordinary Differential Equations and numerical Integration.

References:

1. P. Davis, Interpolation and Approximation, Dover, 1975.

2. S.D.Conte and C. deBoor, Elementary Numerical Analysis 3ed, McGraw Hill, 1981.

National Institute of Technology Srinagar

Hazratbal, Srinagar, Kashmir, 190 006. India

Detailed Syllabus

Semester 8th

Computer Science & Engineering

Department of Computer Science & Engineering
National Institute of Technology, Srinagar.

Subject: Industrial Organization & Management Semester: 8th

L T P Course No. HSS 801 Credits: 3
3 0 0 Deptt: Humanities

Course Details:

1. Industry, meaning of Industrialization, Industrial revolution, Need problems and prospects of Industrial change in the developing countries.

2. Industrial Evolution in India:
   Downfall of early industries, evolution of modern industry, effects of partition, industrial policy and progress after independence.

3. Forms of Industrial Organization:
   a) Single Proprietorship
   b) Partnership
   c) Joint Stock companies.
   d) Cooperatives and
   e) State Enterprises.

4. Growth of Industry and Management:
   Meaning of industrial management, functions and tools of management, growth of management concepts.

5. Objectives of Industrial Management:
   Defining management objectives, managerial activity and objectives, tests of management of objectives, primary, secondary personal and social objectives of management.

6. Management Organization**:**
   Various forms of organization of departmentalization line staff, functional and committee organization, formal and non formal organization.

7. Management and Authority.
8. Decision Making in Management.
9. Leadership, Definition, Traits, inborn traits, acquired traits, analytical etc.,
10. Marketing of Industrial Products and the Sales Manager.
11. Personal Management:
    Recent changes in personal management function of personal departments, sections, training and placement other functions of personal department.

National Institute of Technology Srinagar

Hazratbal, Srinagar, Kashmir, 190 006. India

Detailed Syllabus

Electives

Computer Science & Engineering

Elective I

MTH 611: Operation Research and Optimization

Introduction to Operational Research, Linear programming, Duality theory and Sensitivity Analysis, Transportation models (TP), Network models, Queuing models, Dynamic programming, Game theory, Simulation

ECE 610: VLSI Design

Review of MOS transistor models. CMOS logic families including static, dynamic and dual rail logic. Integrated Circuit Layout; Design Rules, Parasitics. Building blocks; ALU's, FIFO's, counters. VLSI system design; data and control path design, floor planning, Design methodology; Introduction to hardware description languages (VHDL), logic circuit and layout verification. Design examples.

CSE 608: Simulation and Modelling

Fundamentals of modelling, Classification of simulation models; The simulation process; System investigation, model formulation, validation and translation; Time flow mechnisams; Design of computer simulation experiments; Simulation of complex discrete-event systems with applications in industrial and service organizations. Tactical planning and managment aspects, Random variable generation and analysis.

CSE 609: Graph Theory

Introduction to Graph Theory, definition of graph along with the related terms: vertex (or node), edge (or arc), loop, degree, adjacent, path, circuit, planar, connected and component. Euler Circuits and Paths: Königsberg bridge problem, the Euler paths. Coloring Problems Adjacency Matrices, several algorithms to find a shortest path.

Elective II

CSE 708: Digital Signal Processing

Signals as sequences. Linear time invariant operators. The impulse response. The discrete fourier transform. The ztransform. Aliasing in frequency and periodicity in time. Bandlimited- ness and the sampling theorem. Filters, FIR and IIR. Various properties of the transforms and their use in filter design. The fast fourier transform and its uses. Rudiments of Estimation. Applied topics.

CSE 709: Multimedia technology

Introduction to Multimedia, Multimedia Objects, Multimedia in business and work. Multimedia hardware, Memory & Storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools. Text, Sound MIDI, Digital Audio, audio file formats, MIDI Audio & Video Capture. Huffman Coding, Shannon Fano Algorithm,

Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression ratio loss less & lossy compression. Digital Audio concepts, Sampling Variables, Loss less compression, loss compression & silence compression. Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding. Video representation, Colors, Video Compression, MPEG standards, MHEG recent development in Multimedia.

CSE 710: Web Programming

PHP, which will run on either a LAMP (Linux - Apache - MySQL - PHP) or a Windows web server. ASP.NET, which runs on Windows web servers and uses Visual Studio as the development environment. A working knowledge of PHP, ASP.NET, and Drupal. Data types and control statements common to all modern programming languages. Microsoft's Visual Studio programming environment. The use of SQL (Standard Query Language) to handle data from databases.

CSE 711: Logic Programming

Introduction, Lambda Calculus, translating high level functional language into the lambda calculus, structured types, semantics of pattern matching and efficient compilation, list comprehension, polymorphic type checking, graph reduction of lambda expressions, lazy evaluation, Super combinators, SK combinators, G-code, strictness analysis, SASL, Examples of functional languages - ML, Haskell. Logic Programming : Logic and Reasoning, Logic programs, Prolog syntax and its principal primitives. Some important techniques: tail recursion, accumulators, difference lists. Some applications such as simple theorem proving, Natural Language Processing, Expert Systems. Implementation of logic programs. Constraint Logic Programming: constraint satisfaction, constraint propagation- rationale, methodology and examples.

Elective III

CSE 713: Embedded Systems

Introduction, Characteristics of Embedding Computing Applications, Concept of Real time Systems, Challenges in Embedded System Design, Design Process, Requirements, Specifications, Architecture Design, Designing of Components, System Integration, Embedded System Architecture, Instruction Set Architecture, Embedded Processor/Microcontroller Architecture, CISC Examples, RISC Example, Memory System Architecture, Caches, V M, Memory Management and Address Translation, I/0 Sub-system, Co-processors/Hardware Accelerators, Processor Performance Enhancement, Pipelining, Super-scalar Execution, CPU Power Consumption, Designing Embedded platforms, Using CPU Bus , Memory Devices and their Characteristics, I/O Devices, Component Interfacing, Designing with Processors, Implementation Programming, Program Design, Programming Languages, Operating System, Basic Features of an Operating System , Kernel Features, Real-time Kernels, Real-time Memory Management, I/O, Example Real-time OS, Evaluating and Optimising Operating System Performance, Network Based Embedded Applications, Distributed Embedded Architectures, Internet-Enabled Systems, Wireless Applications, Embedded Control.

IT 712: Advanced Java

Introduction, Java keywords and identifier naming conventions. Java primitive types. Type conversions and promotion rules between primitive types. The Java reference types. Strings, arrays and classes. Differences in creating, copying and comparing primitive types and reference types. Java classes and objects. Variable default values. Method signature. Class methods and variables, instance methods and variables. Object constructor methods. Method and constructor overloading. Using objects as parameters. Methods returning an object type. Access control. Public, private and protected instance variables. Public, private, protected, static, abstract, final, native and synchronized methods. Nested and inner classes. Subclasses and inheritance. Subclass constructors, default constructor and constructor chaining. Superclass variable referencing a subclass object. Using superclass members. Overriding superclass methods. Preventing method overriding and and class inheritance. Abstract classes. Java Garbage collection. Java packages. Access control and protection in packages. Importing packages in programs. Java interfaces. Defining, implementing, accessing, applying and accessing interfaces. Java strings. String handling - methods in String class. Java one and multidimensional arrays. Object literal syntax for creating strings and arrays. Exception handling in Java. Java input/output. Java. Lang package. Simple type wrappers. Number, double, float, byte, short, int, long, character, boolean, process and void. The Math class. Java Utility and Collection Classes. Java.util package. The collections framework.

CSE 714: System on Chip (SoC)

Introduction to the concept of a SOC, Backgrounder, microprocessor and Microcontroller based systems, Embedded systems. Differences between Embedded systems and SOCs. System design , Concept of system, importance of system architectures, introduction to IMD, SSID, MIMD and MISD architectures, concept of pipelining and parallelism. Designing microprocessor /Microcontroller based system and embedded system. System design issues in SOCs. System buses: Introduction to busses used in SOCs. Introduction to AMBA bus. Detailed study of IBM's core connect bus, concept of PLB-processor local bus and OPB-on chip peripheral bus. Processors used in SOCs : Introduction to CISC ,RISC, Von Neuman and Harward Architecture. Concept of Soft processors and study of Microblaze RISC processor. Study of IBM's power PC, SOC implementation , Backgrounder – programmable logic and FPGA Architecture . Concept of embedded processors and study of virtex II PRO Architecture. Study of features like embedded RAMs ,multipliers ,Digital clock management etc. Introduction to tools used for SOC design, Xilinx embedded development kit.

IT 715: Advanced Internet Technologies

Review of computer networks, The Internet, Domains and addresses, options for connecting, S/W, modems etc., The internet toolkit: Electronic email, ftp, telnet, finger, etc. WWW, IRC, talk, MUDS, providing resources via internet. HTML, Javascript, CGI, Pearl and Introduction to JAVA, HIP, LISP, Advanced Web Techniques, audio and video coding , multimedia delivery, Servelet and JSP Programming,

Elective IV

CSE 802: Wireless Communication

This course examines common and different aspects of wired and wireless networks. The topics covered are: antenna basics, radio propagation, coding and error control, MAC protocols, network layer protocols to address mobility, TCP and wireless, wireless LANs and ad-hoc networks, cellular communication concepts, wireless mesh networks, long-distance and last-hop wireless technologies, and security in wireless systems.

CSE 803: Fault Tolerant Computing

Fundamental Concepts: Definitions of fault tolerance, fault classification, fault tolerant attributes and system structure. Fault-Tolerant Design Techniques: Information redundancy, hardware redundancy, and time redundancy. Dependability Evaluation Techniques: Reliability and availability models: (Combinatorial techniques, Fault-Tree models, Markov models), Performability Models. Architecture of Fault-Tolerant Computers (case study): General-purpose systems, high-availability systems, long-life systems, critical systems. Software Fault Tolerance: Software faults and their manifestation, design techniques, reliability models. Fault Tolerant Parallel/Distributed Architectures: Shared bus and shared memory architectures, fault tolerant networks. Recent topics in fault tolerant systems: Security, fault tolerance in wireless/mobile networks and Internet.

CSE 804: Image Processing

Digital image fundamentals and transforms. Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms. Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering. Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition. Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG,Basics of Vector quantization. Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes-Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture.

ECE 810: RFIC Design

Introduction to MOSFET Devices, MOSFET modeling, Spice model, Device parasitics, RF modeling, Parasites sensitive to RF. Issue in RF IC a brief review, Impedance matching, use and design of passive circuits, LNA Design, Matching Techniques using algebra techniques, Basic Bond circuits, UHF Mixer design.Cross talk, Cross connect architecture, Cross

Connect characteristics, classification, Cross connect mechanism, Cross connect mitigation, Cross connect reduction, multiple Cross connect sources. EMI, EMC, Importance in ASIC Design, Introduction, EDA Tool in ASIC Design, Design Flow, testing, Environment, sources of EMI/ RFI, Solutions.

Elective V

CSE 805: System Design

And logic gates: Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates. Combinational logic: Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL). Design with msi devices: Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits. Synchronous sequential logic: Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for sequential logic circuits, Shift registers and counters. Asynchronous sequential logic: Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

CSE 806: Real time Systems

Concept of Real Time System, Issues in real time computing, Performance measures of Real Time System, Issues in Real Time Computing, Performance measures of Real time Systems, Real Time Application. Task Assignment and Scheduling: Different task model, Scheduling hierarchy, offline vs Online Scheduling, Clock Drives. Model of Real Time System, Scheduling hierarchy Scheduling of Periodic Task: Assumptions, fixed versus dynamic priority algorithms, schedulability test for fixed priority task with arbitrary deadlines. Scheduling of Aperiodic and Sporadic Tasks.Scheduling for applications having flexible constrains. Resources and Resource Access Control: Assumptions on resources and their usage, resource contention, resource access control (Priority Ceiling Protocol, Priority Inheritance protocol, Slack Based Priority Ceiling Protocol, Preemption Ceiling Protocol). Multi Processor Scheduling, Real time Communication:Weighted Round Robin Service, Medium access Control Protocol, Real Time Protocol.

IT 809: E-commerce

Overview of E-Commerce Technologies: Encryption overview, Elements of an encryption system, Secret key encryption, Public-key encryption, Digital signatures, Digital Certificates, Cryptography export restrictions, Secure Sockets Layer(SSL), Secure Electronic Transactions (SET),Smart Cards and its applications. Electronic Data Interchange-Working of EDI,EDI Standards(includes variable length EDI standards),Cost Benefit Analysis of EDI, Electronic Trading Networks, EDI Components, File Types ,EDI Services, EDI Software, Business Approach of EDI, EDIFACT(Overview, Structure, EDIFACT Software),Business Future of EDI,EDI Administration. EDI Security, Security Mechanisms, Technological aspects (Smart Cards, Worm Disks, Biometrics), Security Mechanism. Security Issues in E-Commerce Technologies- Introduction to Security, Passwords, Viruses, Firewalls, Encryption (PGP, SHTTP, SSL). Enterprise Resource Planning-Evolution of ERP, Characteristics, Features,

Components, Need, ERP Vendors, Business Process Reengineering, Advantages of ERP Packages, Implementation of ERP Packages, Integrated SAP Model, Integrated Data-Master Data, Transactional data, Integrated Processes, Pros and cons of integration, SAP Architecture and Integration.

CSE 807: Unix & Shell Programming

File and common commands - Shell - More about files - Directories- Unix system - Basics of file Directories and filenames - Permissions - modes - Directory hierarchy - Devices - the grep family - Other filters - the stream editor sed - the awk pattern scanning and processing language - files and good filters. Command line structure - Metacharacters - Creating new commands - Command arguments and parameters - program output as arguments - Shell variables - More on I/O redirection - loop in shell programs - Bundle - Setting shell attributes, Shift command line parameters - Exiting a command or the shell, evaluating arguments - Executing command without invoking a new process - Trapping exit codes – Conditional expressions. Customizing the cal command, Functions of command, While and Until loops - Traps - Catching interrupts - Replacing a file - Overwrite - Zap - Pick command - News command - Get and Put tracking file changes.Standard input and output - Program arguments - file access - A screen at a time printer - On bugs and debugging - Examples - Zap - pick - Interactive file comparison program - Accessing the environment - Unix system calls - Low level I/O, File system Directories and modes, Processors, Signal and Interrupts.Program development - Four function calculator - Variables and error recovery - Arbitrary variable names, Built in functions, Compilation into a machine, Control flow and relational operators, Functions and procedures - Performance evaluation - Ms macro package - Troff level - Tbl and eqn preprocessors - Manual page - Other document preparation.