

**SHANMUGHA ARTS, SCIENCE,
TECHNOLOGY & RESEARCH ACADEMY**
SASTRA UNIVERSITY
(A University established under Section 3 of the UGC Act, 1956)
Srinivasa Ramanujan Centre, Kumbakonam



SUBJECTS OF STUDY AND SYLLABI FOR

B.TECH (CSE) PROGRAMME

SHANMUGHA
ARTS, SCIENCE, TECHNOLOGY AND RESEARCH ACADEMY (SASTRA)
TIRUMALAISAMUDRAM - 613 402.
School of Computing - B.Tech., (CSE) Scheme of Study.
(For Candidates Admitted From 2004 Onwards)

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SEMESTER V:

Subject Code	Subject Title	Periods of Instruction			Credit Points
		L	T	P	
BCSE 501	NUMERICAL METHODS	3	1	0	4
BCSE 502	DESIGN AND ANALYSIS OF ALGORITHMS	3	1	0	4
BCSE 503	DBMS AND RDBMS	3	1	0	4
BCSE 504	OPERATING SYSTEM	3	1	0	4
BCSE 505	COMPILER DESIGN	3	1	0	4
BCSE 506 R01	INTERNET PROGRAMMING	3	0	0	3
BCSE 507 R01	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0	0	3	2
BCSE 508	DBMS LAB	0	0	3	2
BCSE 509	OPERATING SYSTEM LAB	0	0	3	2
BCSE 510	INTERNET PROGRAMMING LAB	0	0	3	2
BCSE 511	HR SKILLS – III	1	0	0	1
	TOTAL	19	5	12	32

SEMESTER VI:

Subject Code	Subject Title	Periods of Instruction			Credit Points
		L	T	P	
BCSE 601	OBJECT ORIENTED ANALYSIS AND DESIGN	3	1	0	4
BCSE 602 R01	COMPUTER GRAPHICS	3	1	0	4
BCSE 603	COMPUTER NETWORKS	3	1	0	4
BCSE 604	SYSTEM SOFTWARE	3	1	0	4
BCSE 605 R01	ADVANCED MICROPROCESSOR AND INTERFACING	3	1	0	4
BCSE 606	ELECTIVE – I	3	0	0	3
BCSE 607	COMPUTER GRAPHICS LAB	0	0	3	2
BCSE 608	COMPUTER NETWORKS LAB	0	0	3	2
BCSE 609	SYSTEM SOFTWARE LAB	0	0	3	2
BCSE 610 R01	ADVANCED MICROPROCESSOR AND INTERFACING LAB	0	0	3	2
BCSE 611	HR SKILLS – IV	1	0	0	1
	TOTAL	19	5	12	32

ELECTIVE I:

1. COMBINATORICS & GRAPH THEORY
2. AUTOMATA THEORY
3. COMPUTER SECURITY
4. PROBABILITY AND QUEUEING THEORY

BCSE 601 OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	CREDITS
3	1	0	4

UNIT I

Introduction: Objects - attributes- Behavior and methods - Class hierarchy- Polymorphism- Associations-aggregation-object oriented systems development Life cycle- Use case driven approach.

UNIT II

Methodologies: Object oriented methodologies- Rumbaugh modeling-Booch methodology-Jacobson methodologies-patterns-the unified approach.

UML Design Notation: static and dynamic models-UML diagrams-UML class diagrams-use case diagrams-interaction diagrams-state chart and activity diagram-component and deployment diagrams-packages-UML extensibility.

UNIT III

Object Oriented Analysis: Identifying use cases- effective documentation-classification-noun phrase approach-common class patterns approach-associations-super/subclass relation-class responsibility-object responsibility.

UNIT IV

Object Oriented Design: process and design axioms-coupling and cohesion – class visibility-attribute refinement-design issues-access layer (DBMS, Database organization, access control, client/server computing, distributed objects computing)-view layer(interface objects, visual components)- examples (banking) – Internet Orientation.

References:

1. Ali Bahrami, "Object Oriented Systems Development Using UML", TMH,1999
2. Simon Bennett, Steve Mc Robb, Ray Farmer, "Object Oriented Systems Analysis and design using UML", Mc Graw Hill International Publishers, 1999

BCSE 602 R01 - COMPUTER GRAPHICS

L T P CREDITS
3 1 0 4

UNIT I

Introduction: Display devices-Hardcopy devices-Interactive input devices-Display processors-Graphic Adaptors-Basic function, Video monitors – Graphics software-Output Primitives – line, circle and ellipse drawing algorithms- attributes of output primitives-Interactive input Techniques.

(15)

UNIT II

Two Dimensional concepts: Two dimensional transformations- Translation, Rotation, Scaling ,Reflection, shearing – composite transformations – window and viewport concepts - clipping and windowing –line clipping – Cohen Sutherland algorithm, Liang Barsky Algorithm, polygon clipping – Sutherland Hodgeman algorithm, Weilor Atherton algorithm , Text clipping , Exterior clipping.

(15)

UNIT III

Three dimensional concepts - methods of 3D representation – CSG method , Polygon table method , Octree method - 3D transformations -viewing -3D clipping – Projection – hidden surface and hidden line elimination methods–shading – Polygon Rendering methods - coloring methods.

(15)

UNIT IV

Segmented display files-display file compilation - Computer graphics applications: 3D Modeling - CAD / CAM – image processing, VLSI, games graphs and charts animation – introduction of graphics and kernel system(GKS)-binding language for GKS-programming examples using GKS and PHIGS.

(15)

References:

1. Donald Hearn and Pauline Baker ,“Computer Graphics”, PHI,1994
2. Foley, Van Dam, Feiner Hughes, “Computer Graphics – Principles and Practice”, Pearson Education Asia , LPE, Second Edition, 2001
3. Newman W.M. and Sproull R.F., "Principles of Interactive Computer Graphics", Tata McGraw Hill, Second Edition, New Delhi, 1997

BCSE 603 COMPUTER NETWORKS

L	T	P	CREDITS
3	1	0	4

UNIT - I

Introduction: Networks Applications, line configuration - point to point- Multipoint, Topology - Mesh - Star- Tree-Bus-Ring-Hybrid: **Transmission Modes** : Simplex, Half duplex, Full duplex **Categories of Networks:** LAN, WAN, MAN.

OSI Model - Functions of layers - Physical Layer: Analog & Digital Signals, encoding, Transmission of digital data, Interfaces and Modems, Transmission Media

UNIT – II

Error detection & Correction: Types of error - Detection - Error Correction, Data link control – line discipline – Flow Control – Error Control, Data link protocols: Asynchronous protocols- Synchronous Protocols-Character Oriented Protocols-Bit Oriented Protocols;

LAN-IEEE Standards-LLC-MAC-PDU-Ethernet: CSMA/CD, Addressing – Frame format, **Token Bus-Token Ring:** Token passing , Addressing – Frame format; **FDDI:** Token Passing- Addressing-Frame Format –SMDS

UNIT – III

Network Layer: Circuit Switching, Packet Switching, Message Switching- Connection Oriented & Connectionless Services- ISDN- Broad Band ISDN- Routing algorithms- Congestion control algorithms- Networking and internetworking devices.

Transport Layer: Duties of Transport layer- Connection-ISO transport protocol.

UNIT – IV

Session Layer: Session & Transport interaction – Synchronization points -

Presentation Layer: Translation-encryption/decryption, Authentication, Data Compression -**Application Layer:** Message Handling System-File transfer, Access & Management , Virtual Terminal- Directory Services.

Case Study: ATM, TCP/IP-Overview, Network Layer, Transport Layer.

References:

1. Behrouz Forouzan, "Data Communication and Networks", McGraw Hill, 1999.
2. Andrew S. Tanenbaum , Computer Networks , Prentice Hall of India,1999.
3. S.Keshav, An Engineering approach to computer networking, Addison Wesley,2000

BCSE 604 SYSTEM SOFTWARE

L	T	P	CREDITS
3	1	0	4

UNIT I

Introduction: System software –machine structure-hypothetical computer model-instruction set-Simplified instructional computer(SIC) machine architecture and programming–traditional(CISC) machines – Vax and Pentium Pro–RISC machines – Ultra SPARC, PowerPC and Cray T3E architectures - Compiler basics – Operating System basics

UNIT II

Assemblers: Functions-Data Structures -machine dependent assembler –program relocation - machine independent assembler- One pass assembler and multi pass assemblers-assembler design options-implementation.- AIX assembler

UNIT III

Loaders and Linkers: Functions- design – boot strap loader -machine dependent loader – Date Structures – Automatic library search –machine independent loader-loader design options-implementation – Dynamic Linkage - Implementation.

UNIT IV

Macro processors: Functions - Macro Definition – Algorithms and Data Structures – machine independent macro processor –macro processor design options- Recursive Macro Expansion – Macro Processing with Language translators – implementation of MASM, ANSCI C, ELENA macros.

References:

1. Leland L Beck, " System software " ,III edition, Addison Wesley ,1999.
2. D M Dhamdhare, "Introduction to System software" , Tata McGraw hill,1999

BCSE 605 R01 ADVANCED MICROPROCESSOR AND INTERFACING

L	T	P	CREDITS
3	1	0	4

UNIT I

8086: Intel 8086 architecture – system connections, timing and interrupts – Minimum and maximum mode of operation – 8086 Hardware overview – Basic signal flow and 8086 buses – Bus activities during a write machine cycle – address decoder concepts – addressing and decoding – accessing memory and ports in microcomputer systems – 8086 timing parameters – 8086 interrupts and responses – 8086 interrupt types.

(15)

UNIT II

8087 coprocessor : The 8087 Numeric Data Processor – NDP’s data types – Processor architecture – Instruction set – Example . 8089 : The 8089 I/O processor – IOP architecture – Communication between CPU and IOP - Instruction set of 8087 – Example.

(15)

UNIT III

OTHER PROCESSORS : Intel 80286,386,486 architecture – instruction set, addressing schemes – modes of operations and memory management of 80286,386 and 486 – comparative study of 286,386 and 486 – Overview of Pentium processor.

(15)

UNIT IV

8051 – The 8051 microcontroller introduction – Architecture – hardware details – Pins and ports – Memory – counters , timers , Serial data I/O and interrupts – Instruction set – Applications: Keyboards, Displays , Analog to Digital Interfacing and Digital to Analog Interfacing.

(15)

References:

1. Barry B Brey "The Intel Microprocessors : Architecture , Programming and Interfacing ", IV ed, 1997.
2. Yu Cheng Liu and Gibson , " Microcomputer Systems : 8086/8088 family architecture , Programming and Design " , PHI, 2000.
3. Kenneth J Ayala ,"The 8051 Microcontroller : Architecture , Programming and Applications ",PRI , 2ed,1996.

BCSE 606 E01 COMBINATORICS & GRAPH THEORY

L	T	P	CREDITS
3	1	0	4

UNIT I

Basic Combinatorial numbers-Generating functions and recurrence relations-symmetric functions. (12)

UNIT II

Multinomials - Inclusion and exclusion principle-Permutations with Forbidden Positions. (12)

UNIT III

Necklace problems and Burnside's lemma – Cycle index of a permutation group. (12)

UNIT IV

Ordinary & exponential generating functions – partitions of a positive integer – Recurrence relation-algebraic solution of linear recurrence relations with Constant coefficients- Solution of recurrence relations with constant coefficients - Problems. (12)

UNIT V

Graph theory: Graphs, Multi graphs & bipartite graphs-paths, circuits and Cycle – Complete graphs & planar graphs-Forests and trees-vertex colouring of graphs-matching and coverings – Digraph & Dilworth theorem , network flows- Menger's theorems and Applications . (12)

References:

1. Combinatorics - Theory & Applications, V.Krishnamurthy, Affiliated east west Pvt. Ltd., New Delhi 1995.
2. Graph Theory with applications to Engineering & Computer Science, Narsingh Deo, PHI, New Delhi 1998.

BCSE 606 E03 AUTOMATA THEORY

L	T	P	CREDITS
3	1	0	4

UNIT I

Languages and Problems: Symbols – Alphabets and strings – languages – operation on languages – Alphabetical Coding – types of problems – representation of graphs – spanning trees- Decision problems – Function problems – Security problems – enumeration – regular expression – application of regular expression

UNIT II

Fundamental Machines – Basic machine notation – Deterministic Finite Automata (DFA) – Non Deterministic Finite Automata (NFA) – Equivalence of DFA and NFA – Properties of Finite State Languages – machine for five language operations – Closure under complement, Union, Intersection, Concatenation and Kleene star – Equivalence of regular expressions and DFA – Pumping Lemma for Regular Language – Applications of pumping Lemma

UNIT III

Fundamental Machines - Push Down Automata – Turing Machines – Deterministic Turing machine – Multiple work tape turing machine – Non Deterministic turing machine – equivalence of Deterministic turing machines and non deterministic turing machines – Un decidable languages – Relation among classes – grammars – regular grammars – context free – grammar – closure properties of context free grammar- parsing with non deterministic push down automata – parsing with deterministic pushdown automata – parse trees

UNIT IV

Computational Complexity: Asymptotic notations – Time Space Complexity – Simulations – Reducibility -Circuit Complexity – Boolean circuit model of computation – circuit resources – examples

Polynomial time – P Completeness theory – examples of P Completeness – General machine simulation – NAND circuit value problems - Circuit problems and reduction

References:

1. Green Law, Hoover, "Fundamentals of the Theory of Computation – Principles and practice", Morgan & Kauffman Publishers, 1998
2. John E Hopcraft, Rajeev Motwani, Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", PEA, Second Edition, 2001

BCSE 606 E04 COMPUTER SECURITY

L	T	P	CREDITS
3	1	0	4

UNIT I

Foundations: Terminology – substitution ciphers – and transposition ciphers – Security Attacks – Security Services – model for network Security – Conventional Encryption Principles – Stream Ciphers – Block Ciphers - Cryptography – Crypt analysis – Feistel Cipher structure – location of encryption – Block cipher modes of operation – Electronic Code Book mode – Cipher block Chaining mode – Cipher feedback mode – Output feedback mode

UNIT II

Managing Secret Keys – Security Objectives –Basic issues in Secret Key Management – Technology – random key generation – deployment – example: Manual Key distribution – technology: Automatic Re Keying – Key Distribution Centers – Maintaining Keys and system security – Choosing between strong and weak cryptography properties of good crypto Algorithm – Crypto Algorithm to consider selecting a block Cipher mode – Identifying a safe key length – levels of risk for different applications

UNIT III

Cryptographic Protocols: Introduction to protocols Communication using symmetric Cryptography – one way functions – one way hash functions – communication using PK Cryptography – Cryptographic Protocols – Digital Signatures – Digital signature with encryption – random and pseudo random sequence generation - Key Exchange Authentication

UNIT IV

Basic Algorithms: Data Encryption Standard (DES) - **Public Key Algorithms:** RSA (RNeist and Shamir Adelman) - **One Way Hash Function:** Secure Hash Algorithm (SHA) - **Public Key:** Digital Signature Algorithm (DSA) - **Key Exchange Algorithms:** Diffie Hellman

References:

1. Bruce Schneier, "Applied Cryptography", John Wiley, Second Edition, 1996
2. Richard E Smith, "Internet Cryptography", PEA, 1999
3. William Stallings, "Cryptography and Network Security Principles and practice", AW, Second Edition, 2000
4. William Stallings, "Network Security Essentials – Applications and Standards", PEA, 2001

BCSE 606 E05 PROBABILITY AND QUEUEING THEORY

L	T	P	CREDITS
3	1	0	4

UNIT I

Probability: Probability – Axioms – conditional probability – independence of events – BAYES rule – random variable – discrete - continuous distribution expectation – definition – properties – moments

UNIT II

Stochastic process: processes – classification – poisson process – de markov process - renewal model of program behavior

UNIT III

Makov Chains: Discrete and continuous parameters markov chains – nth step Transition Probability – state classification – limiting distribution – M/G/1/QUEUEING systems – discrete and continuous parameters – birth and death of process analysis of program execution time.

UNIT IV

Network queues: Open queuing networks – closed queuing networks – non exponential substitution – distribution – multiple job types – Non Product form networks

References :

1. Kishore S Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications, (PHI), 1994
2. Medhi, J.P., "Stochastic Processes", John Wiley & Sons Inc., 1994.

BCSE 607 COMPUTER GRAPHICS LAB

L	T	P	CREDITS
0	0	3	2

1. Drawing through graphic primitives in graphics.h
2. Bresenham's line drawing algorithm
3. Circle generation algorithm.
4. Ellipse generation algorithm.
5. 2D Transformation Translation and Rotation, Scaling.
6. Plotting the Pixel Maps
7. 2D Transformation Shear and Reflection
8. 2D Transformation Clipping and Clamping.
9. 2D Transformation Animation.
10. 3D Transformation Translation.
11. 3D Transformation Rotation
12. 3D Transformation Scaling.

BCSE 608 COMPUTER NETWORKS LAB

L	T	P	CREDITS
0	3	2	2

1. File transfer using RS 232 Interface
2. File Transfer Using TCP/IP
3. Client and Server using TCP/IP Sockets
4. Client and Server using Data grams
5. Remote Procedure calls using C sockets
6. Remote Procedure calls using Java RMI
7. Encryption/Decryption Algorithm
8. Finding the Network Address and Shortest path finding
9. Using Networking Classes and Interfaces
10. Data Compression Algorithm (Huffman text compression)
11. Simulation of Routing Algorithm
12. Simulation of Congestion Control Algorithm

BCSE 609 SYSTEM SOFTWARE LAB

L	T	P	CREDITS
0	0	3	2

1. Inter process communication
2. Implementation of a text editor
3. Removal of loop invariants in a 'C' program
4. Lexical Analyzer Compiler Tool Study – simple examples, Yacc Study – simple examples
5. Write a lex specification for decimal numbers.
6. Write a lex program which changes any numbers in its input into hexadecimal representation.
7. Write a lex program to change all characters in its input from uppercase to lowercase, unless they're enclosed inside a C comment.
8. Develop a Lex program that generates a symbol table
9. Write a lex program that reads HTML data containing markups written in lowercase (eg: <p>) or mixed case (eg <Code>), and converts some subset of the HTML markups to uppercase (eg <P>). All other text should be written to the output
10. Design of Calculator grammar with variables and real values (using lex and yacc)
11. Simulation of a loader
12. Put the following grammar into the form required by YACC and add error tokens to specify error recovery. Note that the terminals of this grammar are all in bold font. You will need to write a simple lexer as well yacc.

```
program      -> statement_list

statement_list -> statement_list statement
                | statement
                | statement -> ID := expression ;
                | if expression then statement_list fi ;
                | null ;
expression   -> expression + ID
                | ID
```

BCSE 610 R01 ADVANCED MICROPROCESSOR AND INTERFACING LAB

L	T	P	CREDITS
0	0	3	2

1. Study of 8086.
2. Basic arithmetic operations using 8086.
3. Linear search & binary search using 8086.
4. Insertion sort & Bubble sort using 8086.
5. Basic arithmetic operations using 8087.
6. Solving Newton - Raphson equation using 8087.
7. Interfacing ADC with 8086.
8. Basic operations using 8051.
9. Program for finding largest and smallest number using 8051.
10. Program for Ascending and descending order using 8051.
11. Traffic light controller using 8051.
12. Program for code conversion using 8051.
- 13,14,15. Experiments on Advance Microprocessor (Using Pentium Processor)

BCSE 611 HR SKILLS - IV

L	T	P	CREDITS
1	0	0	1

Week1: Employers' expectations

Week2: Bio-data resume and CV

Week3: Resume writing

Week4: Application writing

Week5: Essentials of group discussion

Week6: Group discussion

Week7: Group discussion

Week8: Marketing skills

Week9: Aptitude test

Week10: Decision making

Week11: Assertiveness

Week12: Personality test

Week13: Technical test

Week14: Motivation

Week15: Mind skills