

ANNA UNIVERSITY COIMBATORE

REGULATIONS 2007-08

B.Sc. COMPUTER TECHNOLOGY

SEMESTER IV

Code No.	Course Title	L	T	P	M	C
Theory						
	Probability and Statistics	3	0	0	100	3
	Operating Systems	3	0	0	100	3
	Internet Programming	4	0	0	100	4
	Software Engineering	4	0	0	100	4
	Elective – I	4	0	0	100	4
Practicals						
	Operating Systems Lab	0	0	3	100	1.5
	Internet Programming Lab	0	0	3	100	1.5
	Software Engineering Lab	0	0	3	100	1.5

Code No.	PROBABILITY AND STATISTICS	L	T	P	M	C
		3	0	0	100	3

UNIT – I STATISTICS (12)

Introduction - Classification and tabulation of statistical data – Diagrammatic and graphical representation of data.

UNIT – II MEASURES OF CENTRAL TENDANCY (12)

Mean , Median and Mode (Revision) – Range – Quartile deviation – Mean deviation – Standard Deviation – Measures of Skewness

UNIT – III CORRELATION AND REGRESSION (12)

Karl Pearson’s Coefficient of correlation – Spearman’s Rank correlation – Regression lines and co-efficients.

UNIT – IV PROBABILITY & DISTRIBUTIONS (12)

Basic concepts - Conditional Probability- Addition and multiplication theorem – Random variables - Characteristics and applications of Binomial, Poisson and Normal distributions - simple problems.

UNIT – V TESTING OF HYPOTHESIS (12)

Concept of hypothesis – level of significance – testing difference between mean, proportions (Large and Small)- Chi-square distribution- Applications of test of independence of attributes and Goodness of fit – Testing of population variance. Statistical Quality Control: Introduction- Control charts for variables and attributes: - \bar{X} , R, np, p & c charts.

Total : 60

REFERENCES

1. S.C. Gupta & V.K. Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons, New Delhi, 2002
2. Veerarajan T., “Probability, Statistics and Random Processes”, Tata McGraw-Hill, New Delhi, 2002.
3. Ronald E. Walpole et al “Probability & Statistics for Engineers & Scientists”, Pearson Education, 2002.
4. Jay L.Devore, “Probability and Statistics for Engineering and the Sciences”, Thomson Asia Pvt Ltd., Singapore, 2002.

Code No.	OPERATING SYSTEMS	L	T	P	M	C
		3	0	0	100	3

UNIT I **9**

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

UNIT II **9**

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

UNIT III **9**

System Model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV **9**

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V **9**

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

TOTAL : 45

REFERENCE BOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.
2. Harvey M. Deitel, “Operating Systems”, Second Edition, Pearson Education Pvt. Ltd, 2002.
3. William Stallings, “Operating System”, Prentice Hall of India, 4th Edition, 2003.
4. Pramod Chandra P. Bhatt – “An Introduction to Operating Systems, Concepts and Practice”, PHI, 2003.

Code No.	INTERNET PROGRAMMING	L	T	P	M	C
		4	0	0	100	4
UNIT I	BASIC NETWORK AND WEB CONCEPTS					9
Internet standards – TCP and UDP protocols – URLs – MIME – CGI – Introduction to SGML.						
UNIT II	JAVA PROGRAMMING					9
Java basics – I/O streaming – files – Looking up Internet Address - Socket programming – client/server programs – E-mail client – SMTP - POP3 programs – web page retrieval – protocol handlers – content handlers - applets – image handling - Remote Method Invocation.						
UNIT III	SCRIPTING LANGUAGES					9
HTML – forms – frames – tables – web page design - JavaScript introduction – control structures – functions – arrays – objects – simple web applications						
UNIT IV	DYNAMIC HTML					9
Dynamic HTML – introduction – cascading style sheets – object model and collections – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data						
UNIT V	SERVER SIDE PROGRAMMING					9
Servlets – deployment of simple servlets – web server (Java web server / Tomcat / Web logic) – HTTP GET and POST requests – session tracking – cookies – JDBC – simple web applications – multi-tier applications.						
TOTAL : 45						

REFERENCE BOOKS

1. Deitel, Deitel and Nieto, "Internet and World Wide Web – How to program", Pearson Education Publishers, 2000.
2. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2002
3. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
4. Thomno A. Powell, "The Complete Reference HTML and XHTML", fourth edition, Tata McGraw Hill, 2003.
5. Naughton, "The Complete Reference – Java2", Tata McGraw-Hill, 3rd edition, 1999.

Code No.	SOFTWARE ENGINEERING	L	T	P	M	C
		4	0	0	100	4

UNIT I SOFTWARE PROCESS 9

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT II SOFTWARE REQUIREMENTS 9

Functional and non-functional - user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT III DESIGN CONCEPTS AND PRINCIPLES 9

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems - Real time software design – system design – real time executives – data acquisition system - monitoring and control system. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

UNIT IV TESTING 9

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT 9

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

TOTAL : 45

REFERENCE BOOKS

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 6th edition, 2004.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.

Code No.	INTERNET PROGRAMMING LABORATORY	L	T	P	M	C
		0	0	3	100	3

LIST OF EXPERIMENTS

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Write programs in Java to create applets incorporating the following features:
 Create a color palette with matrix of buttons
 Set background and foreground of the control text area by selecting a color from color palette.
 In order to select Foreground or background use check box control as radio buttons
 To set background images
4. Write programs in Java to do the following.
 Set the URL of another server.
 Download the homepage of the server.
 Display the contents of home page with date, content type, and Expiration date.
 Last modified and length of the home page.
5. Write programs in Java using sockets to implement the following:
 HTTP request
 FTP
 SMTP
 POP3
6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
7. Write programs in Java using Servlets:
 To invoke servlets from HTML forms
 To invoke servlets from Applets
8. Write programs in Java to create three-tier applications using servlets for conducting on-line examination.
 for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
9. Create a web page with the following using HTML
 To embed a map in a web page
 To fix the hot spots in that map
 Show all the related information when the hot spots are clicked.
10. Create a web page with the following.
 - i) Cascading style sheets.
 - ii) Embedded style sheets.
 - iii) Inline style sheets.
 - iv) Use your college information for the web pages.

Code No.	OPERATING SYSTEM LAB	L	T	P	M	C
		0	0	3	100	3

(Implement the following on LINUX platform. Use C for high level language implementation)

1. Shell programming
 - Command syntax
 - write simple functions
 - basic tests
2. Shell programming
 - loops
 - patterns
 - expansions
 - substitutions
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
7. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I
10. Implement some memory management schemes – II

Example for expt 9 & 10 :

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space.

When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

Code No.	Software Engineering lab	L	T	P	M	C
		0	0	3	100	3

1. Study of case tools such as rational rose or equivalent tools
2. **Requirements**
Implementation of requirements engineering activities such as elicitation, validation, management using case tools
4. **Analysis and design**
Implementation of analysis and design using case tools.
5. Study and usage of software project management tools such cost estimates and scheduling
6. Documentation generators - Study and practice of Documentation generators.
7. Data modeling using automated tools.
8. Practice reverse engineering and re engineering using tools.
9. Exposure towards test plan generators, test case generators, test coverage and software metrics.
10. Meta modeling and software life cycle management.

LIST OF ELECTIVES FOR B.Sc. - COMPUTER TECHNOLOGY (3 YEARS)

Code No.	Course Title	L	T	P	M	C
	SEMESTER - IV					
	<u>Multimedia Systems</u>	3	0	0	100	3
	<u>Compiler Design</u>	3	1	0	100	4
	<u>Professional Ethics</u>	3	0	0	100	3
	<u>Principles of Data Communication</u>	3	0	0	100	3

Code No.	MULTIMEDIA SYSTEMS	L	T	P	M	C
		3	0	0	100	3
UNIT-I Introduction to Multimedia		9				
Introduction to making Multimedia- Multimedia Skills and training- Text: Using text in Multimedia-Computer and Text- Font Editing and Design Tools- Hypermedia and Hypertext						
UNIT II Multimedia File Handling		9				
Sound – Images – Animation - Video						
UNIT –III Digital Video and Image compression		9				
Evaluating a compression system - Redundancy and visibility-Video compression techniques- Standardization of an algorithm - The JPEG image compression standard- ITU –T Standards - MPEG motion video compression standard-DVI Technology.						
UNIT-IV Hardware, Software and Multimedia Authoring Tools		9				
Multimedia Hardware: Macintosh and Windows production platforms-Hardware Peripherels: Memory and Storage Devices, Input Devices, Output Devices, Communication Devices .Basic Software Tools						
UNIT V Multimedia and Internet		9				
Internetworking –connections -Internet services -Tools for WWW - Designing WWW.						
						Total : 45

References:

1. Multimedia: Making It Work, Tay Vaughan, 7th Edition, Tata Mc-Graw Hill. (Unit I, II, IV and V), 2008.
2. Multimedia Systems, John F.Koegel Buford, Pearson edition, 2003. (unit III).
3. Ranjan Parekh, Principles of Multimedia, TMH, 2006.
4. Multimedia: Computing, Communication and applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Edition, 2001.

Code No.	COMPILER DESIGN	L	T	P	M	C
		3	1	0	100	4

UNIT I INTRODUCTION TO COMPILING 9

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

UNIT II SYNTAX ANALYSIS 9

Role of the parser – Writing Grammars – Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

UNIT III INTERMEDIATE CODE GENERATION 9

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

UNIT IV CODE GENERATION 9

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS 9

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

TUTORIAL 15

TOTAL : 60

REFERENCE BOOKS

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education Asia, 2003.
2. Allen I. Holub “Compiler Design in C”, Prentice Hall of India, 2003.
3. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003.
4. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.

Code No.	PROFESSIONAL ETHICS	L	T	P	M	C
		3	0	0	100	3

Unit – I ENGINEERING ETHICS 9

Senses of ‘engineering ethics’ – variety of moral issues – types of inquiry – moral dilemmas – moral autonomy – Kohlberg’s theory – Gilligan’s theory – consensus and controversy – professions and professionalism – professional ideals and virtues – theories about right action – self-interest – customs and religion – uses of ethical theories.

Unit – II ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation – engineers as responsible experimenters – codes of ethics – a balanced outlook on law – the Challenger case study.

Unit – III ENGINEER’S RESPONSIBILITY FOR SAFETY 9

Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk – the Three Mile Island and Chernobyl case studies.

Unit – IV RESPONSIBILITIES AND RIGHTS 9

Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – intellectual property rights (IPR) – discrimination

UNIT – V GLOBAL ISSUES 9

Multinational corporations – environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors – moral leadership – sample code of conduct

TOTAL : 45

REFERENCE BOOKS:

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw Hill, New York, 1996.
2. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico, 1999.
3. Laura Schlesinger, "How Could You Do That: The Abdication of Character, Courage, and Conscience", Harper Collins, New York, 1996.
4. Stephen Carter, "Integrity", Basic Books, New York, 1996.
5. Tom Rusk, "The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life", Viking, New York, 1993

Code No.	Principles of Data Communication	L	T	P	M	C
		3	0	0	100	3

1. BASICS OF COMMUNICATION

Basics of AM, FM and PM Block Diagram, Concepts of AM, FM modulators and demodulators - Pulse modulation systems - Pulse amplitude modulation - Sampling, Quantisation, Quantisation error. **9**

2. INFORMATION THEORY & CODING

Discrete Messages - Concepts of entropy and information rate - Shannon's theorem - channel capacity - Orthogonal signals and their use - Introduction to coding - Coding and Decoding - Algebraic codes, burst error correction codes - Convolution coding and decoding . **9**

3. DATA TRANSMISSION CONCEPTS

Concepts and Terminology- Analog and Digital transmission, Transmission impairments - Transmission media - Synchronous/Asynchronous transmission - Line Configurations - interfacing. **9**

4. DATA ENCODING

Digital data Digital signals - Variations of NRZ and biphase - Digital data Analog signals - ASK, FSK, PSK, QPSK - Analog Data Digital signals - PCM, DM. **9**

5. DATA LINK CONTROL

Flow control, Error control - HDLC, Multiplexing. **9**

Total L : 45

REFERENCE BOOKS

1. Taub and Schilling, "Principles of Communication Systems", Tata Mc Graw Hill Pub. Co., New Delhi, 2002.
2. William Stallings, "Data and Computer Communications", Sixth Edition, Pearson Education, Prentice Hall of India, New Delhi, 2002.
3. Prakash C. Gupta, "Data Communications", Prentice Hall of India, New Delhi, 2002