B.Sc. (Computer Science)
Curriculum & Syllabi
(2012 - 13 onwards)

Outline

VIT®
UNIVERSITY
(Estd. u/s 3 of UGC Act 1956)
Vellore - 632 014, Tamil Nadu, India

School of Computing Science & Engineering

B. Sc. (Computer Science)
Curriculum
(2012 - 2013 onwards)

University Core

SI. No.	Course Codes	Course Title	LTPC/ No. of credits	Prerequisite
1.	ENG104	Basic English	2 0 2 3	
2.	ENG105	Functional English	2 0 2 3	ENG104
3.	CHY104	Environmental Studies	3 0 0 3	
4.	MAT107	Computational Methods	3 1 0 4	
		Total Credits	**13**	

University Elective

SI. No.	Course Codes	Course Title	LTPC/ No. of credits	Prerequisite
1.		University Elective	3 0 0 3	
		Total Credits	**3**	

Programme Core

SI. No.	Course Codes	Course Title	LTPC/ No. of credits	Prerequisite
1.	ENG108	Communicative English	2 0 2 3	ENG105
2.	ENG109	Professional English	2 0 2 3	ENG108
3.		Fundamentals of Computer Science	3 1 0 4	None
4.	CSC201	Problem Solving Techniques	3 1 0 4	None
5.	CSC103	Programming in C	3 1 2 5	None
6.	MAT108	Discrete Mathematics	3 1 0 4	None
7.	CSC107	Digital Logic and Computer Design	3 0 2 4	None
8.	CSC110	Computer Architecture	3 1 0 4	Digital Logic
9.	MAT202	Linear Algebra	3 1 0 4	None

10.	MAT211	Applied Probability & Statistics	3 1 0 4	None
11.	CSC209	Microprocessors	3 0 2 4	Computer Architecture
12.	CSC106	Object Oriented Programming	3 0 2 4	Programming in C
13.	CSC102	Data Structures	3 1 2 5	Discrete Mathematics
14.	CSC307	Visual Programming	3 1 2 5	Object Oriented Programming
15.	CSC207	Principles of Operating Systems	3 1 0 4	None
16.	CSC203	Fundamentals of Database Management Systems	3 1 2 5	Data Structures
17.	CSC202	System Software	3 1 0 4	Principles of Operating Systems
18.		Principles of Graphics & Multimedia	3 1 2 5	Visual Programming
19.	CSC204	Introduction to Computer Networks	3 0 2 4	Principles of Operating Systems
20.		Java Programming	3 1 2 5	Object Oriented Programming
21.		Web Technology	3 0 2 4	Java Programming
22.	CSC315	Principles of Software Engineering	3 1 0 4	Fundamentals of Database Management Systems
23.	CSC399	Project	10	Registered/Completed for 120 credits
		Total Credits		**102**

Programme Elective

Sl. No.	Course Codes	Course Title	LTPC/ No. of credits	Prerequisite
1.	CSC311	Data Communication and Networking	3 0 0 3	Introduction to Computer Networks
2.	CSC308	E – Commerce	3 0 0 3	Fundamentals of Database Management Systems
3.	CSC318	Data Mining	3 0 0 3	Fundamentals of Database Management Systems
4.	CSC317	Data Warehousing	3 0 0 3	Data Mining
5.	CSC316	Software Quality and Testing	3 0 0 3	Principles of Software Engineering
6.	CSC313	Object Oriented Analysis and Design	3 0 0 3	Principles of Software Engineering
7.	CSC319	Computer Hardware	3 0 0 3	Principles of Operating Systems
8.	CSC310	Decision Support System	3 0 0 3	Fundamentals of Database Management Systems
9.	CSC306	Enterprise Resource Planning	3 0 0 3	E – Commerce
10.		Open Source Software Development	3 0 0 3	web Technology
11.	CSC305	System Administration	3 1 0 4	System Software
		Total Credits	**12**	

Credit Summary	
Minimum Qualifying credits	130
Total credits Offered (UC+UE+PC+PE)	130
UC – University Core	13
UE – University Elective	3
PC – Programme Core	102
PE - Programme Elective	12

Semester Split-Up

SEMESTER-I							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1	ENG104	Basic English	02	00	02	03	None
2	MAT108	Discrete Mathematics	03	01	00	04	None
3	CSC201	Problem Solving Techniques	03	01	00	04	None
4	CSC103	Programming in C	03	01	02	05	None
5	CSC107	Digital Logic and Computer Design	03	00	02	04	None
			Total Credits			**20**	

SEMESTER – II							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1	ENG105	Functional English	02	00	02	03	ENG 104
2	MAT202	Linear Algebra	03	01	00	04	Discrete Math
3		Fundamentals of Computer Science	03	01	00	04	None
4	CSC110	Computer Architecture	03	01	00	04	DL
5	CSC106	Object Oriented Programming	03	00	02	04	Prog. in C
6	CSC102	Data Structures	03	01	02	05	Dis Math
			Total Credits			**24**	

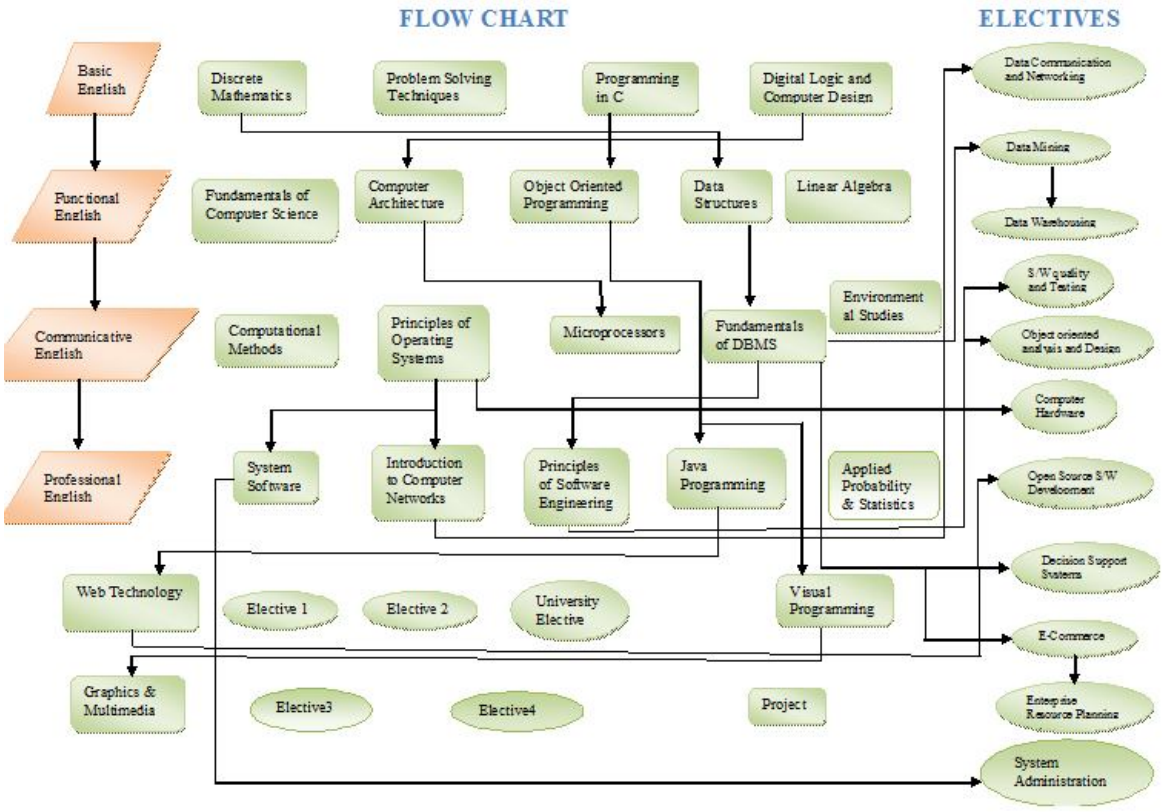
SEMESTER – III							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1	ENG108	Communicative English	02	00	02	03	ENG105
2	MAT107	Computational Methods	03	01	00	04	None
3	CHY104	Environmental Studies	03	00	00	03	None
4	CSC207	Principles of Operating Systems	03	01	00	04	None
5	CSC209	Microprocessors	03	00	02	04	C.A
6	CSC203	Fundamentals of Database Management Systems	03	01	02	05	DS
			Total Credits			**23**	

SEMESTER – IV							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1	ENG109	Professional English	02	00	02	03	ENG108
2.	MAT211	Applied Probability & Statistics	03	01	00	04	None
3	CSC202	System Software	03	01	00	04	OS
4	CSC315	Principles of Software Engineering	03	01	00	04	DBMS
5	CSC204	Introduction to Computer Networks	03	00	02	04	OS
6		Java Programming	03	01	02	05	OOP
			Total Credits			**24**	

SEMESTER – V							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1		Web Technology	03	00	02	04	Java
2	CSC307	Visual Programming	03	01	02	05	OOP
3		Programme Elective – I	03	00	00	03	
4		Programme Elective – II	03	00	00	03	
5		University Elective				03	
			Total Credits			**18**	

SEMESTER – VI							
Sl. No	**Sub code**	**Subject Name**	**L**	**T**	**P**	**C**	**Pre-requisite**
1		Graphics and Multimedia	03	01	02	05	VP
2		Programme Elective – III	03	00	00	03	
3		Programme Elective – IV	03	00	00	03	
4	CSC399	Project	00	00	00	10	
5							
			Total Credits			**21**	

Overall Credits: 130



Syllabi

The Syllabus for English I, English II, English III and English IV to be framed by SSL

The Syllabus for Discrete Mathematics, Linear Algebra, Computational Methods, Applied Probability & Statistics and Environmental Studies to be framed by SAS

Subject code:	Title: **FUNDAMENTALS OF COMPUTER SCIENCE**	LTPC	3	1	0	4
Objectives: This course is to provide the students a clear exposure of types of computers, computer software, and input/output devices.						
Expected Outcome: The students after completion of this course will be able identify various hardware components, different types of software and use the software appropriately.						
Unit No. I	Unit Title: **Introduction**	**9 hours+3 hours**				
Information systems, Software and data, IT in business, Industry, Home, at Play, Education, Training, Entertainment, Arts, Science, Engineering and Maths, Computers in Hiding – Global Positioning System (GPS).						
Unit No. II	Unit Title: **Types of Computers**	**9 hours+3 hours**				
Anatomy of a Computer, Foundations of Modern Information Technology, The Central Processing UNIT, How Microprocessors and Memory Chips are Mad, Memory, Buses for Input and Output, communication With Peripherals.						
Unit No. III	Unit Title: **I/O Devices**	**9 hours+3 hours**				
Inputting Text and Graphics, State of the Art, Input and Output, Pointing Devices, Foundations of Modern Output, Display Screens, Printers, Foundations of Modern Storage, Storage Media, Increasing Data Storage Capacity, Backing up your Data, The Smart Card						
Unit No. IV	Unit Title: **Software**	**9 hours+3 hours**				
User Interfaces, Application Programs, Operating Systems, Document, Centric Computing, Major Software Issues, Network Computing, Word Processing and Desktop Publishing, Spreadsheet and Database Applications.						
Unit No. V	Unit Title: **Network Applications**	**9 hours+3 hours**				
Foundation of Modem Networks, Local Area Networks, Wide Area Networks, Links Between Networks, Networks: Dial-up Access, High Bandwidth Personal Connections, Multimedia, Tools of Multimedia, Delivering Multimedia, Multimedia on Web						
Text Books 1. D.P Curtin, K. Foley, K.Sen and C.Morin, Information Technology, The Breaking Wave, TMH Edition, 2005.						
References 1. Sawyer, Williams and Hutchinson, Using Information Technology, Brief Version, McGraw Hill International Edition – 2003. 2. A. Leon & M. Leon, Fundamentals of Information Technology– Vikas Publishing House Pvt. Ltd. – 2006. 3. ITL Education Solution Limited, Introduction to Computer Science, R&D Wing, PEARSON Education, Edition 2004						
Mode of Evaluation	Assignments/Tests/Seminars/CAT and Term-end examinations					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

<table>
<tr><td>Subject code: CSC201</td><td>Title: PROBLEM SOLVING TECHNIQUES</td><td>L T P C</td><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6"></td></tr>
<tr><td colspan="7">Objectives:
To prepare the efficient logic to implement in the appropriate programming language and to analyze the complexity. To create knowledge on the algorithms for some common problems, to create algorithms on various methods and array techniques, to study on some familiar algorithms for searching and sorting.</td></tr>
<tr><td colspan="7">Expected Outcome:
The students are supposed to have fundamental knowledge in different techniques in solving problems.</td></tr>
<tr><td>Unit No. I</td><td colspan="3">Unit Title: Fundamental algorithms</td><td colspan="3">Number of hours (per Unit)
10 hours</td></tr>
<tr><td colspan="7">Exchange the values of two variables - Counting - Summation of a set of number - factorial computation - Sine. Function computation - Generation of the Fibonacci sequence - Reversing the digits of an integer - Base conversion - Character to number conversion.</td></tr>
<tr><td>Unit No. II</td><td colspan="3">Unit Title: Factoring methods</td><td colspan="3">Number of hours (per Unit)
10 hours</td></tr>
<tr><td colspan="7">Finding the square root of a number - The smallest divisor of an integer - The greatest common Divisor of two integers - Generating prime numbers - Computing the prime factors of an integer - Generation of Pseudo - random numbers - Raising a number to a large power - Computing the n-th Fibonacci number.</td></tr>
<tr><td>Unit No. III</td><td colspan="3">Unit Title: Array techniques</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Array order reversal - Array counting or histogramming - Finding the maximum number in a set - Removal of Duplicates from an ordered Array - Partitioning an array - Finding the kth smallest element</td></tr>
<tr><td>Unit No. IV</td><td colspan="3">Unit Title: Merging, Sorting and Searching</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">The two way merge - Sorting by selection - Sorting by exchange - Sorting by insertion - Sorting by diminishing increment - Sorting by partitioning - binary search - Fast searching.</td></tr>
<tr><td>Unit No. V</td><td colspan="3">Unit Title: Text processing and pattern searching</td><td colspan="3">Number of hours (per Unit)
7 hours</td></tr>
<tr><td colspan="7">Text line length adjustment - Left and right justification of text - Key word searching in text - Text line editing - Linear pattern search - Sublinear pattern search.</td></tr>
<tr><td colspan="7">Text Books
1. R.G.Dromey, How to solve it by computer - PHI, 2007</td></tr>
<tr><td colspan="7">References
1. Robert L.Kruse- Data structures and program design, PHI, 2005.
2. Kunth -Fundamental Algorithm , Narosa Publishing House, 2003.
3. Goodman - Introduction to the Design and Analysis of Algorithms, TMH, 2004.</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>Subject code: CSC103</td><td>Title: PROGRAMMING IN C</td><td>LTPC</td><td>3</td><td>1</td><td>2</td><td>5</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6"></td></tr>
<tr><td colspan="7">Objectives:
To teach the students in developing application program using the “C” programming language. They should be able to understand the data types and operators in C, to create user interactive programs, to design modular programs, to create user defined data types and to work with files in C.</td></tr>
<tr><td colspan="7">Expected Outcome:
The students should be able to develop small projects in C language.</td></tr>
<tr><td>Unit No. I</td><td colspan="2">Unit Title: Introduction</td><td colspan="4">Number of hours (per Unit)
10 hours+3 hours</td></tr>
<tr><td colspan="7">C fundamentals - character set - identifier and key words - data types - constants - variables - declarations - expressions - statements - arithmetic, unary, relational and logical, assignment and conditional operators – hierarchy of operators - library functions - type conversion – data types revisited - bitwise operations – enumerated data type – renaming a data type with typedef.</td></tr>
<tr><td>Unit No. II</td><td colspan="2">Unit Title: I/O Functions</td><td colspan="4">Number of hours (per Unit)
8 hours+3 hours</td></tr>
<tr><td colspan="7">Data input/output functions - simple C program flow of control - control structures - switch, break, continue and go to statements - comma operator</td></tr>
<tr><td>Unit No. III</td><td colspan="2">Unit Title: Functions</td><td colspan="4">Number of hours (per Unit)
8 hours+3 hours</td></tr>
<tr><td colspan="7">Functions - defining, accessing functions - function prototypes - passing arguments – scope rule of functions - recursions - storage classes in C</td></tr>
<tr><td>Unit No. IV</td><td colspan="2">Unit Title: Arrays</td><td colspan="4">Number of hours (per Unit)
10 hours+3 hours</td></tr>
<tr><td colspan="7">Arrays - defining and processing - passing array to functions - multidimensional arrays - arrays and string - structures – declaring a structure – accessing structure elements – array of structures - passing structures to functions - self referent structures – unions</td></tr>
<tr><td>Unit No. V</td><td colspan="2">Unit Title: Pointers</td><td colspan="4">Number of hours (per Unit)
9 hours+3 hours</td></tr>
<tr><td colspan="7">Pointers - declarations - operation in pointers – File – files operations – using argc, argv</td></tr>
<tr><td colspan="7">Text Books
1. Kanithkar Y -Let us C , BPB Publication- New Delhi -11th Edition,-2008
2. K R Venugopal, S R Prasad- Mastering C, The McGraw-Hill Companies,1st edition 2006,</td></tr>
<tr><td colspan="7">References
1. Gottfried B S-Programming with C , II Edition TMH Pub Co Ltd –New Delhi -2010
2. E. Balaguruswamy – Programming in C –TMH – 2010
3. Deitel -C How To Program – Pearson Education – 2010</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

Sample exercise problems for programming in C	
Version No.	
Course Prerequisites:	

LIST OF EXPERIMENTS

1. Determining a given number is prime or not.
2. Pascal's Triangle.
3. String Manipulation.
4. Matrix Multiplications.
5. Finding Determinant of a Matrix.
6. Finding inverse of a Matrix.
7. Checking for Tautologies and Contradictions.
8. Euclidean's Algorithms for finding GCD.
9. Generating Permutations.
10. Computing Combinations.
11. Creating database for telephone numbers and related operations Use file concepts.
12. Creating database for Mailing addresses and related operations Using Structures.
13. Creating database for Web page addresses and related operations using pointers.

Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

<table>
<tr><td>Subject code: CSC107</td><td>Title: DIGITAL LOGIC AND COMPUTER DESIGN</td><td>LTPC</td><td>3</td><td>0</td><td>2</td><td>4</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6"></td></tr>
<tr><td colspan="7">Objectives:
To perform arithmetic and logical operations on data represented in digital form and to implement them using the ICs. The students should have a knowledge on number system and logic gates, to understand the concepts of Boolean algebra and mapping methods, to have a detailed study on flip flop, register and counters, to have study on encoder, decoder and multiplexers and to have analysis on the design of arithmetic logic unit</td></tr>
<tr><td colspan="7">Expected Outcome:
The students should be able to understand the internal representation of data in the various components of a computer and their functions</td></tr>
<tr><td>Unit No. I</td><td colspan="3">Unit Title: Number systems</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Number Systems – Conversion from one number system to another – Complements – Binary Codes – Binary Logic – Logic gates – Truth Tables.</td></tr>
<tr><td>Unit No. II</td><td colspan="3">Unit Title: Boolean algebra</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Boolean algebra – Axioms – Theorems – Simplification of Boolean Functions – Map Method (Upto 5 Variables) – McClausky tabulation method</td></tr>
<tr><td>Unit No. III</td><td colspan="3">Unit Title: Sequential Logic</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Sequential Logic – RS, JK, D and T Flip-flops – Registers – Shift Registers – Counters – Ripple Counters – Synchronous Counters – Design of Counters.</td></tr>
<tr><td>Unit No. IV</td><td colspan="3">Unit Title: Combinational Logic</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Adders – Sub tractors – Decoders – Encoders – Multiplexer – Demultiplexer – Design of circuits using decoders / Multiplexers – ROM – PLA – Designing circuits using ROM/PLA.</td></tr>
<tr><td>Unit No. V</td><td colspan="3">Unit Title: Designing Circuits</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Design of ALU – Design of Status Register – Design of Accumulator – Introduction to Computer Design</td></tr>
<tr><td colspan="7">Text Books
1. M.M.Mano – Digital Logic and Computer Design –PHI – 2007</td></tr>
<tr><td colspan="7">References
1. T.C.Bartee – Computer Architecture and Logic Design –McGraw Hill – 2010.
2. V.Vijayendran , Vijay Nicole –Digital Fundamentals –2005
3. Donald Givone, Sunny Buffalo – Digital Principles and Design –TMH – 2005</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

Sample exercise problems for digital logic and computer design		
Version No.		
Course Prerequisites:		
Unit No. I	Unit Title: **Study of Logic Gates**	Number of hours (per Unit)
1. Logic gates using discrete Components. 2. Verification of truth table for AND, OR, NOT, NAND, NOR and EXOR gates. 3. Realization of NOT, AND, OR, EXOR gates with only NAND gates. 4. Realization of NOT, AND, OR, EXOR neither gates with only NOR gates.		
Unit No. II	Unit Title: **Implementation of Logic Circuits**	Number of hours (per Unit)
1. Verification of Associative law for AND, OR gates.		
Unit No. III	Unit Title: **Adder and Subtractor**	Number of hours (per Unit)
1. Verification of Demorgan's Law. 2. Implementation of Half-Adder and Half-Subtractor. 3. Implementation of Full-Adder and Full-Subtractor. 4. Four bit Binary Adder. 5. Four bit binary subtractor using 1's and 2's Complement.		
Unit No. IV	Unit Title: **Shift Registers**	Number of hours (per Unit)
1. Implementation of Shift registers, Serial Transfer. 2. Ring Counter. 3. 4-Bit Binary Counter. 4. BCD Counter. 5. Counters for arbitrary sequence.		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Subject code: CSC110	Title: COMPUTER ARCHITECTURE	LTPC:	3	1	0	4
Version No						
Course Prerequisites:	Digital Logic and Computer Design					

Objectives:
To understand the design aspects of a computer system and to acquire knowledge on the various components

Expected Outcome:
The students should be able to understand the architecture of a computer system and select the appropriate architecture for different application areas.

Unit No. I	Unit Title: Introduction	9 hours+3 hours

Central Processing UNIT– General Register and Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and manipulation – Program Control – RISC.

Unit No.II	Unit Title: Pipelining	8 hours+3 hours

Pipelining, Arithmetic, Instruction and RISC Pipelining, Vector Processing – Array processors.

Unit No.III	Unit Title: Computer Arithmetic	9 hours+3 hours

Computer Arithmetic – Addition and Subtraction, Multiplication and Division Algorithms, Floating-Point and Decimal Arithmetic operations.

Unit No.IV	Unit Title: Input – Output	10 hours+3 hours

Input-Output Organization – Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer – Priority Interrupt, Direct Memory Access, I/O Processor, Serial Communications.

Unit No.V	Unit Title: Memory	9 hours+3 hours

Memory Organization - Memory Hierarchy , Main Memory , Auxiliary Memory – Associative memory , Cache and Virtual Memory.

Text Books

1. Computer System Architecture – M.M.Mano 3rd Edition PHI -2005

References

1. Computer System Architecture – J.P.Hayes – McGraw-Hill – 2004.
2. Computer Organisation V. Carl Hamacher, unoko G. Vranesic, Safwat G. Zaky – McGraw Hill ISE – 2007.
3. Computer Architecture and Organization Design Principles and Applications - Govindarajalu –TMH – 2003.

Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

<table>
<tr><td>Subject code: CSC209</td><td>Title: MICROPROCESSORS</td><td>LTPC</td><td>3</td><td>0</td><td>2</td><td>4</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6">Computer Architecture</td></tr>
<tr><td colspan="7">Objectives:
To understand the structure of programmable Integrated Circuits, to perform arithmetic and logical operations.</td></tr>
<tr><td colspan="7">Expected Outcome:
On completion of this course the students should have exposure on the architectures of various micro processors and can write assembly level coding for performing arithmetic and logical operations.</td></tr>
<tr><td>Unit No. I</td><td colspan="2">Unit Title: Introduction</td><td colspan="4">Number of hours (per Unit)
10 hours</td></tr>
<tr><td colspan="7">Introduction to microcomputers, Microprocessors and Assembly Languages – microprocessor Architecture and its operations – 8085 MPU – 8085 Instruction set and classifications.</td></tr>
<tr><td>Unit No. II</td><td colspan="2">Unit Title: Programming Concepts</td><td colspan="4">Number of hours (per Unit)
12 hours</td></tr>
<tr><td colspan="7">Writing assembly levels programs – Programming techniques such as looping, counting and indexing addressing modes – Data Transfer Instructions – Arithmetic and Logic Operations – Dynamic Debugging.</td></tr>
<tr><td>Unit No. III</td><td colspan="2">Unit Title: Counters</td><td colspan="4">Number of hours (per Unit)
12 hours</td></tr>
<tr><td colspan="7">Counters and Time delays –Hexadecimal Counter – Modulo 10 Counter – Pulse Timings for flashing lights – Debugging Counter and time delay program stack – subroutine – conditional call and return instructions.</td></tr>
<tr><td>Unit No. IV</td><td colspan="2">Unit Title: Interrupt</td><td colspan="4">Number of hours (per Unit)
11 hours</td></tr>
<tr><td colspan="7">Interrupt – Implementing interrupts – Multiple Interrupt – 8085 – trap – problems on implementing 8085 interrupt – DMA – Memory interfaces – Ram & Rom – I/O interface – Direct I/O – Memory mapped I/O.</td></tr>
<tr><td colspan="7">Text Books
1. R.S. Gaonkar – Microprocessor Architecture – Programming and Application with 8085/8080A - Wiley Eastern Limited – Wiley Eastern Limited – 4th edition.</td></tr>
<tr><td colspan="7">References
1. A. Mathur – Introduction to Microprocessor –TMH – 2006.
2. V.Vijayendran – Vijay Nicole – Fundamentals of Microprocessor 8085 –2009</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

Sample exercise problems for microprocessors		
Version No.		
Course Prerequisites:	Computer Architecture	
Objectives: To learn the assembly language programming on the microprocessors		
Expected Outcome: On completion of this course the students can write programs for performing arithmetic and logical operations.		
Unit No. I	Unit Title: **Addition and Subtraction**	Number of hours (per Unit)
1. 8bit addition 2. 16 bit addition 3. 8 bit subtraction 4. BCD subtraction		
Unit No. II	Unit Title: **Multiplication and Division**	Number of hours (per Unit)
1. 8 bit multiplication. 2. BCD Multiplication 3. 8 bit division.		
Unit No. III	Unit Title: **Sorting and Searching**	Number of hours (per Unit)
1. Searching for an element in an array. 2. Sorting in ascending order. 3. Sorting in Descending order. 4. Finding largest and smallest elements from an array. 5. Reversing array elements. 6. Block Move		
Unit No. IV	Unit Title: **Code Conversion**	Number of hours (per Unit)
1. BCD to HEX and HEX to BCD 2. Binary to ASCII and ASCII to binary 3. ASCII to BCD and BCD to ASCII		
Unit No. V	Unit Title: **Applications**	Number of hours (per Unit)
1. Square of a single byte Hex number 2. Square of a two digit BCD number		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Subject code: **CSC106**	Title: **OBJECT ORIENTED PROGRAMMING**	LTPC	3	0	2	4
Version No.						
Course Prerequisites:	Programming in C					
Objectives: To develop applications using object oriented concepts in programming.						
Expected Outcome: The students should be able to understand the features of object oriented approach over other approaches and develop programs using these characteristics						
Unit No. I	Unit Title: **Introduction to OOP**	Number of hours (per Unit) **12 hours**				
Principles of Object Oriented Programming (OOP) – Software Evaluation – OOP Paradigm – Basic Concepts of OOP – Benefits of OOP – Applications of OOP. Tokens – Keywords – Identifiers – Basic Data types – User Defined data types-Derived Data types-Symbolic Constants-Type Compatibility-Declarations and Dynamic Initialization of Variables - Operators in C++ - Precedence Rule - Scope Resolution Operators-Type cast Operators						
Unit No. II	Unit Title: **Functions**	Number of hours (per Unit) **6 hours**				
Functions in C++-Function Prototyping -Call by reference - Return by reference- inline functions-Default arguments, function overloading.						
Unit No. III	Unit Title: **Class and Objects**	Number of hours (per Unit) **9 hours**				
Classes and Objects – Declaring objects, Defining member functions, Data hiding or encapsulation, Classes objects and memory, Static member variables and functions, Static objects, objects as function arguments ,Friend functions, Friend classes, The const member function, Local classes.						
Unit No. IV	Unit Title: **Constructors and Destructors**	Number of hours (per Unit) **9 hours**				
Constructors and Destructors –constructor with arguments, overloading constructors, Constructor with default arguments, Copy constructors, Destructors, Calling constructors and Destructors. Operator overloading (Unary Operator and Binary Operator).						
Unit No.V	Unit Title: **Inheritance**	Number of hours (per Unit) **9 hours**				
Inheritance: Types of Inheritance – Single Inheritance, Multiple Inheritance, Hierarchical Inheritance, and Hybrid Inheritance-Virtual base Class-Abstract Class. Virtual Function with suitable examples.						
Text Books 1. E. Balagurusamy – Object Oriented Programming with C++ - TMH – 2006						
References 1. Robert Lafore – Galgotia – Object Oriented Programming in Microsoft C++ - 2007 2. Herbert Schildt, The Complete Reference C++- 4th Edition, TMH, 2007. 3. Pohl – Object Oriented Programming Using C++ - Pearson Education – 2006						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Sample exercise problems for object oriented programming	
Version No.	
Course Prerequisites:	Programming in C
Objectives: To provide practical knowledge in the area of object oriented programming	
Expected Outcome: After completion of the course students should be able to develop and design programs using object oriented concepts	

LIST OF EXPERIMENTS

1. Program illustrating function overloading feature.
2. Programs illustrating the overloading of various operators
   Ex: Binary operators, Unary operators, New and delete operators etc.
3. Programs illustrating the use of following functions :
   a) Friend functions b) Inline functions c) Static Member functions
   d) Functions with default arguments.
4. Programs illustrating the use of destructor and the various types of constructors (no arguments, constructor, constructor with arguments, copy constructor etc).
5. Programs illustrating the various forms of inheritance :
   Ex. Single, Multiple, multilevel, hierarchical inheritance etc.
6. Write a program having student as on abstract class and create many derived classes such as Engg. Science, Medical, etc. from students class. Create their objects and process them.
7. Write a program illustrating the use of virtual functions.
8. Write a program which illustrates the use of virtual base class.
9. Write programs illustrating file handling operations:
   Ex. a) Copying a text file b) Displaying the contents of the file etc.
10. Write programs illustrating how exceptions are handled (ex: division-by-zero, overflow and underflow in stack etc)

Mode of Evaluation	
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

Subject code: **CSC102**	Title: **DATA STRUCTURES**	LTPC	3	1	2	5
Version No.						
Course Prerequisites:	Discrete Mathematics					
Objectives: The students should be exposed to the various type of structures used to store the data in such a way that the data can be accessed and manipulated easily. Also, the students are supposed to understand the algorithms to create data structure using linked list, stacks, queues, trees and graphs.						
Expected Outcome: The students should be able to select the suitable data structures for storage and management of different types of data.						
Unit No. I	Unit Title: **Algorithms& Linked lists**	Number of hours (per Unit) **9 hours+3 hours**				
Algorithms for Data Structures- Specifics of PSEUDO – Data types –Constants, Variables and expressions, Program modules in PSEUDO, Logic and Control structures in PSEUDO Arrays, singly linked lists – Insertions and deletions –Variations on linked list structures, Dummy Headers, Circular linked lists, doubly linked lists.						
Unit No. II	Unit Title: **Queues and Stacks**	Number of hours (per Unit) **9 hours+3 hours**				
Circular implementation of a queue – Linked list implementation of a queue, priority queues – Stacks – Array implementation of a stack, Linked list implementation of a stack, Parsing and Evaluation of Arithmetic expressions using stacks, Postfix, Prefix, Infix notations – Converting Infix expressions to Postfix, Evaluating Postfix expressions –Recursion – Towers of Hanoi problem, Recursive Algorithms implemented non-recursively, recursion, stacks and backtracking.						
Unit No. III	UnitTitle:**Sorting& Searching**	Number of hours (per Unit) **10 hours+3 hours**				
Sorting and Searching Algorithm: Sequential and binary search algorithms; Quadratic sorting algorithms (bubble, selection, insertion); O (N log N) sorting algorithms (Quick sort, heap sort)						
Unit No. IV	Unit Title: **Tree structures**	Number of hours (per Unit) **8 hours+3 hours**				
Binary trees, implementing Binary trees, linear representation of binary tree, Linked representation of binary tree, binary tree traversals, Pre-order, In-order, Post-order traversals of binary tree						
Unit No. V	Unit Title: **Graphs and networks**	Number of hours (per Unit) **9 hours+3 hours**				
Implementation of graphs, the adjacency matrix, Depth–first search, breadth–first search. Networks –Minimum spanning tree- the shortest path algorithm. Quantity dependent search techniques, sequential search, Binary search –Density dependent search techniques, Construction of Hashing functions, Collision processing-Indexed search techniques, Indexed sequential search technique.						
Text Books 1. Bhagat Singh, Thomas L.Naps –Galgotia- Introduction to Data Structures - Book Source, 2010.						
References 1. C Aaron M. Tanenbaum, Yedidyah. Langsam, Moshe J Augenstein -Data Structure using, PHI 1994. 2. Schaum's Outline Series-Theory and problems of Data Structures –McGraw Hill Book Company, 2011. 3. Ellis Horowitz, Sartaj Sahni, -Fundamentals of Data Structures - Galgotia Book sources, 2004.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Sample exercise problems for Data Structures	
Version No.	
Course Prerequisites:	Programming in C
Objectives: To provide knowledge on data structures	
Expected Outcome: At the end of course students able to create and use the various data structures using programming languages.	

LST OF EXPERIMENTS

1. Implementing Stacks and queues.
2. Implementation and processing in lists.
3. Sorting:
    a. Insertion sort
    b. Merge sort
    c. Quick sort
    d. Selection sort
    e. Heap sort
    f. Shell sort
4. Searching:
    a. Linear search
    b. Binary search

Mode of Evaluation	
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

<table>
<tr><td>Subject code: CSC307</td><td>Title:VISUAL PROGRAMMING</td><td>LTPC</td><td>3</td><td>1</td><td>2</td><td>5</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6">Object Oriented Programming</td></tr>
<tr><td colspan="7">Objectives:
• To introduce the concept of Visual Programming
• To introduce GUI programming using Microsoft foundation classes
• To enable the students to develop the program and simple applications using Visual C++</td></tr>
<tr><td colspan="7">Expected Outcome:
The students should be able to develop programs using features of visual programming.</td></tr>
<tr><td>Unit No. I</td><td colspan="2">Unit Title Introduction</td><td colspan="4">9 hours</td></tr>
<tr><td colspan="7">Introduction- working with forms: Project Types, Design Forms and Use Standard Controls, Add Controls To and Configure the Toolbox, Project Structure and Use of Templates, Events and Event-Handlers, Common Events, Multiple Form Applications, Forms and Controls Collections</td></tr>
<tr><td>Unit No. II</td><td colspan="2">Unit Title User Interaction</td><td colspan="4">9 hours</td></tr>
<tr><td colspan="7">Pop-Up Menus, Toolbars, Common Dialog Controls, Preserve User Settings Using the Registry, Control Arrays, MDI Applications, MDI Forms, Drag and Drop, ADO, DAO and RDO controls for Database handling.</td></tr>
<tr><td>Unit No. III</td><td colspan="2">Unit Title – Introduction to Windows Programming</td><td colspan="4">9 hours</td></tr>
<tr><td colspan="7">Windows environment – a simple windows program – windows and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context – basic drawing – child window controls</td></tr>
<tr><td>Unit No. IV</td><td colspan="2">Unit Title – Introduction to VC++ programming</td><td colspan="4">9 hours</td></tr>
<tr><td colspan="7">Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – modal and modeless dialog – windows common controls – bitmaps</td></tr>
<tr><td>Unit No. V</td><td colspan="2">Unit Title - The Document And View Architecture</td><td colspan="4">9 hours</td></tr>
<tr><td colspan="7">Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI documents – creating DLLs – dialog based applications – Introduction to OLE - Database Handling with ODBC.</td></tr>
<tr><td colspan="7">Text Books
1. Visual Basic 6 from the ground up, Gray Cornell, Tata McGraw-Hill publications, 2006.
2. Steve Holtzner, “Visual C++ Programming”, Wiley Dreamtech India Pvt. Ltd., 2003.</td></tr>
<tr><td colspan="7">References
1. Visual Basic 6 the complete reference, Noel Jerke, Tata McGraw-Hill publications, 2005.
2. Mastering Visual Basic 6, Evangelos Petroutsos, BPB Publications, 2008.</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

Sample exercise problems for Visual Programming		
Version No.		
Course Prerequisites:	Object Oriented Programming	
Unit No. I	Unit Title	Number of hours (per Unit)
1.Working with simple forms 2. Creating simple application programs by using Intrinsic Controls 3. Programs by using decision making statements 4. Applications with arrays 5. Applications by using functions 6. Design a scientific calculator 7. String functions 8. Date and time functions 9. Rend function 10. MDI Applications 11. Text File Handling 12. Program for demonstrating Common dialog boxes 13. Menus and popup menus 14. Simple Drag and Drop applications 15. Accessing databases using the ADO Data Control		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Subject code: **CSC207**	Title: **PRINCIPLES OF OPERATING SYSTEMS**	LTPC	3	1	0	4
Version No.						
Course Prerequisites:	Computer Architecture					
Objectives: To understand the basic principles of an interface between the user and the computer resources.						
Expected Outcome: The students should understand the functionalities and importance of operating systems						
Unit No. I	Unit Title: **Introduction**	Number of hours (per Unit) **8 hours**				
Operating Systems – Operating Systems Functions – File System – Device Driver – Terminal I/O.						
Unit No. II	Unit Title: **Process Management**	Number of hours (per Unit) **8 hours**				
Process Management – Inter-Process Communication – Dead Lock – Dead Lock prerequisites – Deadlock Strategies.						
Unit No. III	Unit Title: **Memory Management**	Number of hours (per Unit) **9 hours**				
Single Contiguous – Fixed Partitioned – Variable Partitions – Non-contiguous allocations – Paging – Segmentation – Combined Systems – Virtual Memory Management Systems.						
Unit No. IV	Unit Title: **Security Protection**	Number of hours (per Unit) **11 hours**				
Treats – Attacks – Security Violation – Worms – Virus –Design Principles – Authentication – Protection Mechanisms – Encryption – Security in Distributed environment —.						
Unit No. V	Unit Title: **Case Study**	Number of hours (per Unit) **9 hours**				
History & Overview – UNIX file system – Data structures for process/memory management- process states –Windowing Technology, GUI – Components of GUI – Requirements of windows based GUI – MS Windows & Windows NT						
Text Books 1. A.S.Godbole – Operating Systems –TMH – 2009.						
References 1. A. Siberschatz and P.B.Galvin – Operating Systems Concept –Addition Welsey Publishing Company, 2009. 2. H.M.Deitel – Operating Systems –Second Edition – Addison Wesley, 2005.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Subject code: **CSC203**	Title: **FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS**	LTPC	3	1	2	5
Version No.						
Course Prerequisites:	Data structures					
Objectives: To provide the basic concepts of database and to give exposure to design aspects of the different data models.						
Expected Outcome: The students should have basic knowledge about the database to design and use it for the various applications.						
Unit No. I	Unit Title: **Introduction**	Number of hours (per Unit) **9 hours**				
DBMS Basic Concepts-Purpose of Database Systems-Database System/File System-Overall System architecture-Database Languages-Classifications-Data models.						
Unit No. II	Unit Title: **Entity relationship model**	Number of hours (per Unit) **13 hours**				
Mapping constraints-Primary keys-Foreign Keys-Structural Constraints-ER notations-ER model examples-Mapping of conceptual model to relational models.						
Unit No. III	Unit Title:**Relational Database Design**	Number of hours (per Unit) **9 hours**				
Relational Algebra-Database Design: Informal design guidelines- -Functional Dependencies-Normal forms-1NF,2NF,3NF, and BCNF.						
Unit No. IV	Unit Title: **SQL**	Number of hours (per Unit) **8 hours**				
Transaction-Recovery-Concurrency Control						
Unit No. V	Unit Title: **PL/SQL**	Number of hours (per Unit) **6 hours**				
Basics of SQL-DDL-DML-DCL-TCL Commands in detail with examples.PLSQL: Stored procedure Concept-Procedure-Functions-Cursors-Triggers.						
Text Books 1. H.F. Korth and A.Silberschatz Database system concepts — McGraw Hill International Publication – 2010.						
References 1. R. Elmasri & S. B Navathe ,Fundamentals of database systems,Addition Wesley,2010.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Sample exercise problems for Data Base Management Systems		
Version No.		
Course Prerequisites:	Data Structures	
Unit No. I	Unit Title: **Program to learn Oracle DDL Commands**	Number of hours (per Unit)
a. To create a table b. To alter a table c. To drop a table d. To create a view e. To drop a view		
Unit No. II	Unit Title: **Program to learn Oracle DML commands**	Number of hours (per Unit)
a. To insert, delete and update rows into a table. b. To write a simple Queries using SELECT. c. To write queries using SELECT and WHERE. d. To write queries using Logical operators. e. To write queries using NULL. f. To write queries using NVL Function g. To write queries for pattern matching. h. To write queries using order by clause. i. To write queries using distinct clause. j. To write queries using Arithmetic Expressions. k. To write queries using Arithmetic Functions. l. To write queries using group Functions. m. To write queries using Group by clause. n. To write queries using Having Clause. o. To write queries using Character Function. p. To write queries using Data Function. q. To write queries using Sub queries. r. To write queries using join.		
Unit No. III	Unit Title: **Program Commands.**	Number of hours (per Unit)
Program to learn Oracle DCL and TCL command		
Unit No. IV	Unit Title: **Program to learn PL/SQL**	Number of hours (per Unit)
a. To create a cursor and trigger and work on that. b. To create PL/SQL code expression. c. To create PL/SQL code using Control statement. d. To create PL/SQL code using sub programs.		
Mode of Evaluation		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Subject code: **CSC202**	Title: **SYSTEM SOFTWARE**	LTPC	3	1	0	4
Version No.						
Course Prerequisites:	Principles of Operating Systems					
Objectives: To provide the basic concepts of the systems software such as assembler, loader and compiler.						
Expected Outcome: Students should have the basic knowledge about system software.						
Unit No. I	Unit Title: **Introduction**	Number of hours (per Unit) **8 hours**				
System software – machine structure – hypothetical computer model – instruction set – existing computer systems segmentation concepts – internal operation, software tool: software tool program development,editors,debug,monitor,user interface..						
Unit No. II	Unit Title: **Architecture and Interrupts**	Number of hours (per Unit) **10 hours**				
Intel 80386 architecture – addressing modes – instruction set with examples – MASM – assembler directive – programming examples using MASM on an IBM PC – interrupt services in MASM programs.						
Unit No. III	Unit Title: **Assemblers**	Number of hours (per Unit) **10 hours**				
Assembler – functions – machine dependent and independent features – assembler design symbol table – macro processors – functions – features design issues – implementation examples**.**						
Unit No. IV	Unit Title: **Loaders & Linkers**	Number of hours (per Unit) **8hours**				
Loaders and links – basic functions – different schemes – design issues.						
Unit No. V	Unit Title: **Compilers**	Number of hours (per Unit) **9 hours**				
Compilers – software tools – editors – interpreters – program generators – interactive debugging system – subroutine and parameter passing.						
Text Books 1. D.M. Dhamdhere – Introduction to Systems Software –Tata McGraw Hill Publishing Co., Reprint 2011. 2..Santanu Chattopadhay,"System software" Printice Hall,India, second printing 2008						
References . 1. Leland L.Beck – System Software: An Introduction to system programming –Addison – Wesley Publishing Co., 2009. 2. Peter Norton,Richard Wilton -The New Peter Norton Programmer's guide to the IBM FC and PS2 – – Microsoft Press, 2002. 3. Beck – System Software –Pearson Education – 2006.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Subject code:	Title: **COMPUTER GRAPHICS AND MULTIMEDIA**	LTPC	3	1	1	5
Version No.						
Course Prerequisites:	Visual Programming					
Objectives: To learn the basic concepts of computer graphics and multimedia. To understand and design simple graphical packages and various multimedia components.						
Expected Outcome: The students are supposed to develop programs for the different computer graphics and multimedia applications.						
Unit No. I	Unit Title: **Introduction to computer graphics**	**8 hours**				
Image Processing as picture analysis, Advantages and uses of interactive graphics, Conceptual framework for interactive graphics, drawing with SRGP, Basic interaction handling, Raster graphics features, limitations of SRGP						
Unit No. II	Unit Title: **Graphics Algorithms and transformations**	**10 hours**				
Overview, Scan converting lines, Scan converting circles, filling rectangles, clipping lines, Clipping circles and ellipses, Clipping polygons, Generating characters, 2D transformations, Homogeneous coordinates and Matrix representation of 2D transformations, Matrix representation of 3D transformations, Viewing in 3D: Projections, Polygons meshes, Algorithms for Visible-Line determination, Z-buffer algorithm, Scan-line algorithms, Area Subdivision algorithms.						
Unit No. III	Unit Title: **Introduction to Multimedia systems**	**8 hours**				
Multimedia Hardware- Multimedia Software–Meetings the analog signals – Search of Digital recording – CD ROMs-Sound Cards – Playback and Recording – MIDI – working with MIDI- Coloring – Digital Imaging Fundamentals- Digital Image Development and Editing.						
Unit No. IV	Unit Title: **Animation fundamentals and Digital Video techniques**	**9 hours**				
Animation Software tools – Animation Techniques – Digital video fundamentals – Digital video production techniques.						
Unit No. V	Unit Title: **M/M Project Design Concepts and graphics applications**	**10 hours**				
Authoring – Project Development Lifecycle-Project Planning and Costing techniques-PERT & CPM – Multimedia team- Graphics Algorithms for Octrees-Algorithms for curved surfaces, Visible-Surface ray tracing – Virtual reality applications.						
Text Books 1. Donald Hearn and M Pauline Baker - Computer Graphics - PHI - 2nd Edition – 2004. 2. Multimedia Magic – S.Gokul - BPB Publications, 2008.						
References 1. James D Foley, Andries van Dam, Steven K Feiner, John F Hughes - Computer Graphics Addison Wesley - Pearson Education, 2006. 2. Fundamentals of Multimedia – Drew – Pearson Education – 2006. 3. Multimedia Systems – Buford – Pearson Education – 2007.						
Mode of Evaluation	Assignments/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Sample exercise programs for Graphics and Multimedia		
Version No.		
Course Prerequisites:	Visual Programming	
Unit No. I	Unit Title: **Programs in Graphics**	Number of hours (per Unit)
1. Line drawing algorithms 2. Circle drawing algorithms 3. 2-D Transformations 4. 3-D Transformations 5. Line Clipping Algorithms 6. Polygon clipping algorithms		
Unit No. II	Unit Title: **2D Animation software (Adobe Flash)**	Number of hours (per Unit)
1. Study of Adobe Flash Tools 2. Frame by Frame Animation 3. Motion Tweening a) Simple Tweening b) Using Guide Layer 1. Shape Tweening 2. Simple Tweening 3. Shape Hint 4. Masking 5. Single Layer Masking 6. Double Layer Masking 7. Movie Clip 8. Buttons 9. Publishing of Flash Movie		
Unit No. III	Unit Title: **Action Scripts**	Number of hours (per Unit)
1. Simple functions: Stop, Play, Go to, Get URL, Call 2. Properties - _x, _y, _x Scale, _y Scale, _alpha 3. Event handling.		
Unit No. IV	Unit Title: **Image Editing Software (Adobe Photoshop)**	Number of hours (per Unit)
1. Study of Adobe Photoshop tools 2. Image editing 3. Applying special effects.		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

<table>
<tr><td>Subject code: CSC204</td><td>Title: INTRODUCTION TO COMPUTER NETWORKS</td><td>LTPC</td><td>3</td><td>0</td><td>2</td><td>4</td></tr>
<tr><td>Version No.</td><td colspan="6"></td></tr>
<tr><td>Course Prerequisites:</td><td colspan="6">Principles of Operating Systems</td></tr>
<tr><td colspan="7">Objectives:
To understand the fundamental concepts of data communication.
To learn the functions of different layers.
To understand the concepts of Communication in Computer Networks,Protocols and their performance. On completion of this course the students will be able to know the basics of computer networks and can design a new network of computers and can share the resources over that network.</td></tr>
<tr><td colspan="7">Expected Outcome:
The students should be able to develop computer communication systems with their appropriateness in the context of study.</td></tr>
<tr><td>Unit No. I</td><td colspan="3">Unit 1: Physical Layer</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Data communication-networks-Protocols and Standards-Network Models-The OSI Model_Layers in the OSI Model-TCP/IP Protocol Suite-Switching-Cirsuit Switched Networks-Datagram Networks-Virtual Circuit Networks</td></tr>
<tr><td>Unit No. II</td><td colspan="3">Unit Title 2: Data Link Layer</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Error detection and Correction-Introduction-Block Coding-Framing-Flow and Error Control-Protocols-Noiseless Channels-simplest protocol-Stop and wait protocol-Noisy Channels-Stop and Wait Automatic Repeat Request, Go Back N Automatic Repeat Request, Selective Automatic Repeat Request -Multiple access-Random Access-Aloha_CSMA-CSMA/CD-CSMA/CA</td></tr>
<tr><td>Unit No. III</td><td colspan="3">Unit Title 3: Network Layer</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Connective devices,IPv4 Address-Classful Addressing-Classless Addressing-Internetworking –Ipv4 Datagram-Fragmentation-Checksum-Address Mapping-ARP-RARP-ICMP-Types of Messages-Massage Format-Error Reporting-Query-debugging Tools-Delivery-Forwarding-Unicast Routing Protocols-Optimisation –Intra and Interdomain Routing-Distance Vector routing-Link State Routing.</td></tr>
<tr><td>Unit No. IV</td><td colspan="3">Unit Title: Transport Layer</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Process to process delivery-multiplexing and demultiplexing-connectionless Vs Connection oriented service-Reliable Vs Unreliable,UDP, User datagram-Checksum,UDP Operation-Transmission Control Protocol(TCP),TCP services TCP features-TCP Connection-Flow Control,Error Control,Congestion Control-The Berkley API, Socket system Calls,Network Utility Function.</td></tr>
<tr><td>Unit No. V</td><td colspan="3">Unit Title: Application Layer</td><td colspan="3">Number of hours (per Unit)
9 hours</td></tr>
<tr><td colspan="7">Domain Name System-Name Space-Domain Name Space-Distribution of Name Space-DNS I the Internet-Resolution-DNS Message-Types of Records-Dynamic Domain Name System-Remote Logging-Telnet-Electronic Mail-File Transfer-WWW and HTTP-Architechture –Web Documents-HTTP-Introduction to Network Management System.</td></tr>
<tr><td colspan="7">Text Books
1. Behrous A Foriuzan,”Data Communication and Networking”,Tata McGraw Hill,4th Edition,2011</td></tr>
<tr><td colspan="7">References
1.Albert Leon Gracia and Indra Widjaja,”Communication Networks”-fundamental concept & key architechture,Tata McGraw hill,2nd Edition,2009
2.William Stallings, Data & Computer Communication,Pearson education,9th Edition,2011</td></tr>
<tr><td>Mode of Evaluation</td><td colspan="6">Assignments/Quizzes/Seminars/CAT and Term-end examinations.</td></tr>
<tr><td>Recommended by the Board of Studies on</td><td colspan="6"></td></tr>
<tr><td>Date of Approval by the Academic Council</td><td colspan="6"></td></tr>
</table>

Sample exercise problems for Computer Networks		
Version No.		
Course Prerequisites:	Principles of Operating Systems	
Objectives: To train the students on the various functionalities of the computer network.		
Unit No. I	Unit Title	Number of hours (per Unit)
One mini project in network programming: 1.Write a C program to convert a binary file as input and performs bit stuffing and byte stuffing 2.Write a C program to implement CRC computation. 3.Write a C program to show the implementation of Sliding Window protocol. 4.Write a C program to show the implementation of selective and repeat ARQ. 5.Write a C program to show the implementation of Go back and N ARQ. 6.Write a C program to simulate the routing method Distance Vector Routing. 7.Write a C program to simulate the routing method Link State routing. 8.Write a C program to develop a client server application for chat using socket. 9.Write a C program to develop a echo application for UDP using sockets		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Subject code: CSC 301	Title: **JAVA PROGRAMMING**	LTPC	3	1	2	5
Version No.						
Course Prerequisites:	Object Oriented Programming					
Objectives: To design and develop applications and tools that can be accessed over the internet.						
Expected Outcome: On completion of this course the students will have a knowledge on the basics of JAVA programming language and can create internet applications using JAVA.						
Unit No. I	Unit Title: **Introduction**	Number of hours (per Unit) **9 hours+3 hours**				
Overview of JAVA Language: Introduction, Simple Java Program, Java Program Structures, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments.Internet Standard HTML.						
Unit No. II	Unit Title: **Programming Concepts**	Number of hours (per Unit) **9 hours+3 hours**				
Programming style, Constants, Variables, Data Types, Declaration of Variables, and Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, and Standard Default Values.						
Unit No. III	Unit Title: **Operators**	Number of hours (per Unit) **10 hours+3 hours**				
Operator and Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions, Decision Making and Branching: Introduction, Decision Making with IF Statement, Simple IF Statement, The if…else Statement, Nesting of if….else statements, The else if Ladder, The Switch Statement, The ?: Operator. Decision – Making and Looping: Introduction, The While statement, Do-while statement, for loop.						
Unit No. IV	Unit Title: **Classes, Objects and Methods**	**9 hours +3 hours**				
Introduction , Defining a Class, Adding Variables, Adding Methods ,Creating Objects, Accessing Class members, Arrays, Strings and Vectors: Arrays, One dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes.						
Unit No. V	Unit Title: **Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance**	Number of hours (per Unit) **9 hours+3 hours**				
Extending a class, Overriding Methods, Final Variables and Methods, Finalizer Methods, Abstract Methods and Classes, Visibility Control, Applet Programming. Servlet programming						
Text Books 1. E.BalaGuruswamy- Programming with JAVA, A Primer, TMH, 2006.						
References 1. Shishir Gundavaram- CGI Programming on the World Wide Web, O' Reilly and Associates, 2007. 2. P.Naughton and H.Schild - Java2 the Complete Reference-TMI-2005. 3. K.Arnold and J.Gosing- Java Programming Language- Pearson Education - 2007						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Sample exercise problems for JAVA Programming	
Version No.	
Course Prerequisites:	Introduction to Computer Networks

1. Write and Execute a JAVA Program that Capitalize a word name for example cOMpUTer To Computer.
2. Write and Execute a JAVA Program that generates a random integer tests whether it is positive and Displays.
3. Write and Execute a JAVA Program that generates random integers and reports whether it is divisible by 2, by 3, by 5.
4. Write and Execute a JAVA Program that inputs three names and then prints them in their increasing alphabetical order (use the string class method comparedTo()).
5. Write and Execute a JAVA Program that prints the number of days in a given month.
6. Write and Execute a JAVA Program that tests the Summation Formula ∑i-1 I= n(n+1)/2
7. Write and Execute a JAVA Program that tests the Summation Formula ∑i=1 I^2 = (n^2 $(n+1)^2$)/4.
8. Generate a random integer n in the range 0 to 100, Sum the integer from 1 to n, Compute the Value of the Expression on the right and then print both values to see that
9. Write and Execute a JAVA Program for sorting array using Bubble sort/Selection sort.
10. Write and Execute a JAVA Program to Search an element in an array/Linear Search and Binary Search.
11. Write and Execute a JAVA Program that implements the Fibonacci function recursively.
12. Write and Execute a JAVA Program that implements the Factorial function recursively.
13. Write and Execute a JAVA Program to implement Students Personal and Academic Classes.

Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

Subject code: **CSC305**	Title: **SYSTEM ADMINISTRATION**	LTPC	3	1	0	4
Version No.						
Course Prerequisites:	System Software					

Objectives:
To setup the environment for gaining the sufficient knowledge in Unix Concepts and System Administration

Expected Outcome:
By providing the sufficient background knowledge, students will be tuned to make themselves as a good programmer and system administrator.

Unit No.I	Unit Title: **Introduction**	Number of hours (per Unit) **8 hours**

The Unix Architecture and command usage, General Purpose Utilities: cal, date, echo, printf, bc, script, mailx, passwd, who, uname, tty, stty. The file system: The File, Parent Child Relationship, Home Directory, Checking Current Directory, Changing Current Directory, Making Directories, Removing Directories, Listing Directory Contents

Unit No.II	Unit Title: **File Handling**	Number of hours (per Unit) **9 hours**

Commands for handling ordinary files: cat, cp, rm, mv, more, wc, cmp, diff. Compressing and Decompressing Files: gzip, bunzip(bz2). The Archival Program: tar. Basic File Attributes: ls, file & directory permissions, Changing File Ownership, chmod, The vi Editor, More File Attributes

Unit No.III	Unit Title:Filter and Shell Programming	Number of hours (per Unit) **11 hours**

Simple filters: head, tail, cut, paste, sort, grep. Essential Shell Programming:
Using Command Line arguments, Logical Operators, The if Conditional, Computation and String Handling, while and for Loops.

Unit No.IV	Unit Title: **Essential System Administration**	Number of hours (per Unit) **9 hours**

The System Administrator's login: root, The System Administrator Privileges, Startup and Shutdown, User Management : useradd; /etc/passwd and /etc/shadow/; usermod and userdel; Umask; Password administration.

Unit No.V	Unit Title **Advanced System Administration**	Number of hours (per Unit) **8 hours**

Networking Tools: Checking the network - ping, Remote Login: telnet, ssh, File transfer protocol, IP Configuration - ifconfig, Partitions, File Systems: Creating a Partitions-fdisk, Creating a file system – mkfs, File System Checking – fscd, Mounting and Unmounting file sysems, Backups.

Text Books
1. Sumithaba Das: UNIX Concepts and Applications (Second Edition), Tata McGraw Hill, 2010 (Chapters 1 to 21, 23 to 26)

References
1. Kenneth Rosen et al: UNIX: The Complete Reference, Osborne/ McGraw Hill, 2003. 2. Steve Moritsugu: Using UNIX, Prentice-Hall India, 2004.
3. Mark, G. Sobel: A Practical Guide to the UNIX System, Addison Wesley, 2005.
4. Brain Kerninghan and Rob Pike: the UNIX Programming Environment, Prentice-Hall India, 2004.

Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	

Subject code: **CSC315**	Title: **PRINCIPLES OF SOFTWARE ENGINEERING**	LTPC	3	1	0	4
Version No.						
Course Prerequisites:	Fundamentals of Data Base Management Systems					
Objectives: To create software based on a set of procedures so that it can comply with some predefined standards.						
Expected Outcome: On completion of this course the students will be able to know the steps involved in the creation of software and can test the software to ensure standard.						
Unit No. I	Unit Title: **Introduction to Software Engineering**	**10 hours+3 hours**				
Definitions –Software problem - Software engineering problem – Software processes – characteristics of a software process – Software development process.						
Unit No. II	Unit Title: **Planning a Software project**	**9 hours+3 hours**				
Cost Estimation – Project Scheduling-Staffing and Personal planning- s/s requirements –problem analysis- requirements specification						
Unit No. III	Unit Title: **Software Design**	**10 hours+3 hours**				
Function Oriented Design- Design Principles- Module- Level concepts – Design notation and specification – Structured design methodology–Verification-Detailed design- Module Specification-Verification						
Unit No. IV	Unit Title: **Implementation issues**	**7 hours+3 hours**				
Programming practice –Verification –Metrics						
Unit No. V	Unit Title: **Testing Fundamentals**	**9 hours+3 hours**				
Functional Testing- Structural testing- Testing process- Metrics- Reliability						
Text Books 1. Pankaj Jalote – An Integrated Approach to Software Engineering –Narosa Publishing House – 2006						
References 1. Fairley –Software Engineering Concepts –Tata McGraw Hill Edition – 2005. 2. S. Pressman – Software Engineering –McGraw Hill International Edition – 2006. 3. Jawadekar – Software Engineering –TMH – 2004.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Subject code:	Title: **WEB TECHNOLOGY**	LTPC	3	0	2	4
Version No.						
Course Prerequisites:	Java Programming					

Objectives:

1. To understand the basic concepts of web programming and internet
2. To understand how the client-server model of Internet programming works.
3. To develop interactive, client-side, executable web applications.

Expected Outcome:

The students will be able to

1. Understand, analyze and evaluate a system using Internet / web programming concepts.
2. Identify and formulate and solve web related problems.
3. Use techniques, skills and apply algorithmic principles to design web based applications

Unit No. I	Unit Title: **BASIC INTERNET CONCEPTS**	Number of hours (per Unit) **9 hours**

Internet Overview- Networks - Web Protocols – HTTP – HTTPS- FTP- TCP/IP – Web Organization and Addressing DNS and directory services - Internet resources -Applications - Electronic mail, Newsgroups, UUCP, FTP, Telnet, Finger, WORLD WIDE WEB-Overview - Hyper Text Markup Language - CSS- Uniform Resource Locators - Protocols - MIME Types - Plug-ins – Net meeting and chat - Search Engines.

Unit No. II	Unit Title: **BASICS OF WEB DEVELOPMENT**	Number of hours (per Unit) **9 hours**

HTML – Forms – Frames – Tables – Web Page Design – Cascading Style Sheet (CSS) Basics - JavaScript Introduction – Data Types- Operators and Expressions- Control Structures Functions – Arrays – Objects. CGI Concepts – HTML tags Emulation – Server–Browser communication – E–mail generation – CGI Client side Applets – CGI Server Side Applets – Authorization and security – CGI programs using Perl.

Unit No. III	Unit Title: **DYNAMIC WEB DEVELOPMENT**	Number of hours (per Unit) **9 hours**

Server Side Scripting Languages – Introduction to JSP, .NET, CGI, Python – PHP Language Basics - PHP Language Basics - Variables - Data Types - Constants – Conditional Statements - Arrays - Functions. File Handling – File Uploading – Cookie and Session – date – time –exception – filte – Email Basics – Secure Email - Email with attachment – Image Handling- Object Oriented Programming – Interactive Web Application using Ajax and PHP.

Unit No. IV	Unit Title: **DATABASE (MY SQL) - ASP – XML**	Number of hours (per Unit) **9 hours**

Database, Relational Database model- SQL – Querying from database – Writing into web databases – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods. Document Object Model – Simple API for XML – Extensible Stylesheet languages – Formatting Objects – Xpath, XLink and XPointer – Introduction to SOAP.

Unit No. V	Unit Title: **SERVLETS AND JSP**	Number of hours (per Unit) **9 hours**

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.

Text Books

1. Deitel & Deitel, Internet & World Wide Web How to program, Prentice Hall 2011.
2. D. Norton and H. Schildt - Java2: The complete reference - TMH 2006.

References

1. Deitel & Deitel, Java How to program, Prentice Hall 2002.
2. Gary Cornell and Cay S. Horstmann, Core Java Vol. 1 and Vol. 2, Sun Microsystems Press 1999.
3.. Ted Coombs, Jason Coombs and Don Brewer, Active X source Book, John Wiley & sons 1996

Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.
Recommended by the Board of Studies on	

Date of Approval by the Academic Council	

Sample exercise problems for Web Programming		
Version No.		
Course Prerequisites:	Java Programming	
Objectives: • To provide fundamentals for the web system and internet programming. • To develop interactive, client-side executable web applications.		
Unit No. I	Unit Title	Number of hours (per Unit)
I. Java Programs II. Hyper Text Markup Language (HTML) Activity -1: Introduction to HTML Activity - 2 : Tags in HTML HTML Topics : Words, Lists, Simple Links, More Advanced Text, Simple Images, Tables,Colours, Advanced Links Activity - 3 : Frames in HTML Activity - 4 : Forms in HTML Activity – 5 : HTML Introduction III. Cascading Style Sheet (CSS) IV. JavaScript V. PHP/MYSQL PRGRAMMING		
Recommended by the Board of Studies on		
Date of Approval by the Academic Council		

Programme Elective

Subject code: **CSC311**	Title: **DATA COMMUNICATION AND NETWORKING**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Introduction to Computer Networks					
Objectives: To provide exposure the layers of ISO-OSI reference model, topologies, protocols and multiplexing. Also to provide knowledge on TCP/IP and ATM.						
Expected Outcome: The students should have basic knowledge on the concepts of data communication.						
Unit No. I	Unit Title:	**8 hours**				
Network, Protocols & standards and standards organisations - Line Configuration Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.						
Unit No. II	Unit Title:	**10 hours**				
Parallel and Serial Transmission – DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection – Error Corrections.						
Unit No. III	Unit Title:	**10 hours**				
Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Ethernet - Token Bus - Token Ring - FDDI - SMDS - Circuit Switching Packet Switching - Message switching - Connection Oriented and Connectionless services.						
Unit No. IV	Unit Title:	: **9 hours**				
History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - Packet Layer Protocol ATM - ATM Topology - ATM Protocol.						
Unit No. V	Unit Title:	**8 hours**				
Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.						
Text Books 1. Behrouz and Forouzan, Introduction to Data Communication and Networking, TMH -1999. 2. Jean Walrand - Communication Networks (A first course) - Second Edition - WCB/McGraw Hill - 1998.						
References						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC316**	Title: **SOFTWARE QUALITY AND TESTING**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Principles of Software Engineering					
Objectives: To provide exposure on the factors of software quality and the testing methods.						
Expected Outcome: To understand the impact of testing to ensure the quality of software						
Unit No. I	Unit Title: **Software Testing Process Maturity and Framework for Test Process Improvement**	**8 hours**				
The State of the art and the State of the practice; The clean sheet approach to getting started. Establishing a practical perspective; Critical Choices; Critical Disciplines: Frameworks for Testing.						
Unit No. II	Unit Title: **Testing Methods**	**10 hours**				
Basic verification methods, Getting leverage on verification, verifying documents at different phases, critical success factors for implementing verification; Validation Overview, Validation methods, Validation activities, and Recommendation strategy for validation testing; Controlling Validation costs - Testing tracks, Deliverables, and Chronology,: Master Test Planning, Verification testing tasks and deliverables, validation testing tasks and deliverables, A Testing orphan - User manuals, Life-cycle mapping of tasks and deliverables;						
Unit No. III	Unit Title: **Test Tools**	**8 hours**				
Software testing tools; Categorizing test tools, Tool acquisition; Measurement, Measurement provides answers, Useful measures, and other interesting measures, Recommendations.						
Unit No. IV	Unit Title: **Software Quality**	**9 hours**				
Software Quality Assurance – Quality metrics –Software Reliability –Software Quality and Quality Assurance – Measuring of quality – Standards and procedures – Technical activities – ISO 9000 series standards – ISO 9001 accreditation – Management responsibility – Documented quality system – Training and induction – Relation to ISO 9000-3. Quality system - Documentation, Summary of IEEE/ANSI test related documents						
Unit No. V	Unit Title: **Managing Test Technology, Standard Checklists.**	**10 hours**				
Organizational Approaches to testing; Organizing and reorganizing testing, Approaches to organizing the test function; Current practices, trends, challenges; GUIs : Usage Testing, Tester-to-developer ratios, Software measures and practices benchmark study;						
Text Books 1. Ed Kit - Software Testing in the Real world - Addison-Wesley – 3rd edition,2008. (Chapters 1 to 15). 2. William Perry - Effective Methods for Software Testing - John Wiley – 3r Edition. 3. Darrel Ince - ISO 9001 and Software Quality Assurance – McGraw Hill, New York -2011.						
References: 1. Beizer B - Software Testing Techniques - Van Nostrand Reinluold -2007 2. Myers, G.J,Tom B, Corey S: The Art of Software Testing, - John Wiley ,3rd edition.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC308**	Title: **E-COMMERCE**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Fundamentals of Data Base Management Systems					
Objectives: To introduce to the students the basic concepts of electronic purchase and various payment schemes over a secure layer.						
Expected Outcome: On completion of the course the students will be able to create software for sales and purchase applications.						
Unit No. I	Unit Title: **Electronic Commerce Environment and Opportunities**	**8 hours**				
Background - The Electronic Commerce Environment - Electronic Marketplace Technologies - Modes of Electronic Commerce: Overview - Electronic Data Interchange -Electronic fund transfer.						
Unit No. II	Unit Title: **Approaches to safe Electronic Commerce**	**10 hours**				
Overview - Secure Transport Protocols - Secure Transactions - Secure Electronic Payment Protocol (SEPP) - Secure Electronic Transaction (SET) - Certificates for Authentication - Security on Web Servers and Enterprise Networks						
Unit No. III	Unit Title: **Electronic Cash and Electronic Payment schemes**	**9 hours**				
Internet Monetary Payment and Security Requirements - Payment and Purchase Order Process - On-line Electronic Cash. Internet/Intranet Security Issues and Solutions: The Need for Computer Security - Specific Intruder Approaches						
Unit No. IV	Unit Title: **MasterCard/Visa Secure Electronic transaction**	**9 hours**				
Introduction - E-mail and Secure E-mail Technologies for Electronic Commerce: Introduction - The Means of Distribution - Message handling models- MIME: Multipurpose Internet Mail Extensions - S/MIME: Secure Multipurpose Internet Mail Extensions - MOSS: Message Object Security Services						
Unit No. V	Unit Title**: Internet and Web Site Establishment**	**9 hours**				
Introduction Technologies for Web Servers - Internet Tools Relevant to Commerce - Internet Applications for Commerce Internet Access and Architecture - Searching the Internet - Internet Resources: Creating a Web Site.						
Text Books 1. Daniel Minoli & Emma Minoli, 'Web Commerce Technology Handbook", Tata McGraw Hill - 2002.						
References: 1. K Bajaj & D Nag, E-Commerce, Tata McGraw-Hill ,2nd edition,7th reprint,2009.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC318**	Title: **DATA MINING**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Fundamentals of Data Base Management Systems					
Objectives: To describe and utilize a range of techniques for designing data mining systems.						
Expected Outcome: The students will be able to use the various techniques in data mining.						
Unit No. I	Unit Title: **Data Mining Introduction**	**10 hours**				
Introduction to Data Mining – Data Mining Functionalities – Classification of Data Mining systems, Major issues in Data mining.						
Unit No. II	Unit Title: **Data Mining Primitives, Languages & System Architecture**	**12 hours**				
Data Mining primitives: Task – relevant data – kind of knowledge to be mined – Background knowledge – interestingness measures– presentation & visualization of discovered pattern - Data Mining Query language – Designing Graphical User interfaces based on DMQL - Architecture of Data mining.						
Unit No. III	Unit Title: **Association Rule Mining**	**13 hours**				
Basic concepts – market basket analysis - Mining single dimensional Boolean association rules from transactional databases. Classification & prediction: What's classification - issues regarding classification and prediction – Bayesian classification – prediction: linear – non linear.						
Unit No. IV	Unit Title: **Cluster Analysis**	**10 hours**				
Types of Data in cluster analysis - Major clustering methods. Data mining applications.						
Text Books 1. Han J. & Kamber, M, "Data Mining: Concepts and Techniques", Morgan Kaufmann, 2005. 2. Immon.W.H., "Building the Data Warehouse", Wiley Dream Tech, 3rd Edition, 2003. 3. Anahory S., Murray, D, "Data Warehousing in the Real World", Addison Wesley, 1st Edition, 2009.						
References: 1.Paulraj Punniah : Data Warehousing ,fundamentals for IT professionals,2nd edition.						
Mode of Evaluation	Written examinations, seminar, assignments, surprise tests and quizzes.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC313**	Title: **OBJECT ORIENTED ANALYSIS & DESIGN**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Principles of Software Engineering					
Objectives: To introduce the object-oriented development processes, UML and related methodologies. The students should be able to understand the techniques, applications and UML based object oriented analysis and design.						
Expected Outcome: To be able to design object oriented program modules						
Unit No. I	Unit Title: **Complexity of software**	**8 hours**				
Structure of complex systems, decomposing complexity, Designing complex systems, Object Model: Evolution, Elements of object model, Applying object model						
Unit No. II	Unit Title: **Elements of Notation**	**10 hours**				
Class diagrams, state transition diagrams, object diagrams, Interaction diagrams, module diagrams, process diagrams, applying the notation. Principles, micro development process, macro development process.						
Unit No. III	Unit Title: **Management and planning**	**10 hours**				
Staffing, Release management, Reuse, Quality Assurance and Metrics, Documentation, Tools, Benefits and Risks of Object Oriented development						
Unit No. IV	Unit Title: **Introduction to Object-Oriented Paradigm and UML**	**9 hours**				
Unified Process, the Requirement Workflow, Object-Oriented Analysis Workflow, Object-Oriented Design Workflow, Workflow and phases of the Unified process.						
Unit No. V	Unit Title: **Analysis and Design**	**8 hours**				
Case studies, Teams, Testing, Management Issues, Planning and Estimating, Maintenance, User Interface system, Introduction to Web – Based Systems.						
Text Books 1. Grady Booch, "Object Oriented Analysis and Design with applications", Addison Wesley, 2009						
References 1. Schach, Stephen R., "An Introduction to Object-Oriented Systems Analysis and Design with UML and the Unified Process", Tata McGraw Hill, 2003.						
Mode of Evaluation	Assignment/ Seminar/Written Examination.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code:**CSC317**	Title: **DATA WAREHOUSING**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Data Mining					
Objectives: To provide the basic concepts of data warehousing and its applications.						
Expected Outcome: The students should be able to understand the concepts of data warehouse and its design.						
Unit No. I	Unit Title: **Overview and Concepts**	**9 hours**				
Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing Planning Arid Requirements: Project planning and management, Collecting the requirements.						
Unit No. II	Unit Title: **Architecture and Infrastructure**	**9 hours**				
Architectural components, Infrastructure and metadata Data						
Unit No. III	Unit Title: **Design and Data Representation**	**9 hours**				
Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality						
Unit No. IV	Unit Title: **Information Access and Delivery**	**9 hours**				
Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web						
Unit No. V	Unit Title: **Implementation and Maintenance**	**9 hours**				
Physical design process, data warehouse deployment, growth and maintenance						
Text Books 1. Paulraj Ponnian – Data Warehousing Fundamentals - Pearson Education, 2010.						
References 1. Ralph Kimball- The Data Warehouse Lifecycle toolkit - John Wiley, 2004. 2. W.H. Inmon- Building the Data Warehouses - Wiley Dreamtech, 2006. 3. R. Kimball - The Data Warehouse Toolkit - John Wiley, 2004.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC319**	Title: **COMPUTER HARDWARE**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Principles of Operating Systems					
Objectives: To understand the features hardware components and concepts of interfacing of peripherals.						
Expected Outcome: Students should be able to understand and use the features among various components of a computer system.						
Unit No. I	Unit Title: Organization	**11 hours**				
Organization and Mother board logic of Computers. Organization of computer systems, Motherboard its functions and logic's; operating systems and boot process; the pre-service checkout, power supply; BIOS, chipsets, CMOS, PC cards and peripheral.						
Unit No. II	Unit Title: Functional Units	**9 hours**				
Motherboard circuits, support chips and their interfacing. DMA, Timer, I/O port, parallel, serial, DVD, FDC, HDC, Display, keyboard CD-ROM interfacing, soundboards.						
Unit No. III	Unit Title: Interface	**9 hours**				
Bus Interfacing and Data transfer. Asynchronous and synchronous buses, memory management & interfacing, Bus standards, ISA/FISA bus operations.						
Unit No. IV	Unit Title: Peripherals	**9 hours**				
Trouble shooting PCs. Motherboards, CPU, monitor memory, FDC, HDC, PC cards serials and parallel ports, preventive maintenance.						
Unit No. V	Unit Title: Case Study	**7 hours**				
Case Study: Design and Integration of Peripheral device to a computer system, PC Assembly and Installation Technique						
Text Books 1. Stephen J, Bigelow, "Trouble shooting, maintaining and repairing PCs", Tata McGraw-Hill, New Delhi, 2005,5th edition.. 2. Stanley & Hall, "PC Data Handbook, BPB Publications, New Delhi, 2007.						
References 1. Govindarajulu, "IBM PC and clones Hardware trouble shooting and maintenance, Tata McGraw-Hill, New Delhi, 2008,11th edition. 2. Scott Muller, "Upgrading and Repairing PCs", Microtech Publications, Dubai, 2006. 3. Ronald L.Krutz, "Interfacing Techniques in Digital Design with Emphasis on Microprocessors", John Wiley & Sons New York, 2004.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC310**	Title: **DECISION SUPPORT SYSTEM**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Fundamentals of Data Base Management Systems					
Objectives: To provide the basic concepts of the decision support system and its design components.						
Expected Outcome: The students should posses knowledge on the concepts of decision support system.						
Unit No. I	Unit Title: **Introduction**	**11 hours**				
DSS configuration, characteristics, capabilities, and components of DSS, the user, DSS hardware, distinguishing DSS from management science and MIS, classifications of DSS, data warehousing, access, analysis, and visualization, the nature and sources of data, data collection and data problems, the internet and commercial database services, database management systems in DSS.						
Unit No. II	Unit Title: **Database organization**	**9 hours**				
Database organization and structure, data warehousing, OLAP: data access and mining, querying and analysis, data visualization and multidimensionality, intelligent database and data mining, the big picture. Support systems						
Unit No. III	Unit Title: **Models**	**9 hours**				
The GDSS meeting process, constructing a GDSS and the determinants of its success, GDSS research challenges Modeling for mss, static and dynamic models, treating certainty, uncertainty and risk, influence diagrams, mss modeling in spreadsheets,						
Unit No. IV	Unit Title **Simulation**	**9 hours**				
Heuristic programming, simulation, multidimensional modeling, visual spreadsheets, financial and planning modeling, visual modeling and simulation, ready-made quantitative software packages, model base management,						
Unit No. V	Unit Title **Intelligent DSS**	**7 hours**				
Intelligent DSS, the future of AI. DSS construction; the DSS development process; the DSS of the future, decision making in groups, group DSS, the goal of GDSS and its technology levels,						
Text Books: 1. Efrain Turban And Jay E. Aronson, Decision Support Systems And Intelligent Systems (Fifth Edition), Prentice-Hall, 2010.						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code: **CSC306**	Title: **ENTERPRISE RESOURCE PLANNING**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	E-commerce					
Objectives: To emphasis the concept of ERP, Various Modules and benefits of market issues.						
Expected Outcome: The students should have basic knowledge on the functions of ERP.						
Unit No. I	Unit Title: **Introduction**	**11 hours**				
Introduction to ERP, its evolution, 'its growth, its advantages, its need, integrated management information, business modeling, integrated data model, ERP and related technologies: BPR, MIS, DSS, EIS, data warehousing, data mining, OLAP, supply chain management.						
Unit No. II	Unit Title: **Manufacturing perspective and various modules**	**9 hours**				
MRP, BOM, closed loop MRP, MRP-11, DRP, JIT and kanban, CAD/CAM, PDM, data management, benefits of PDM, MTO, and MTS, ATO, ETO, CTO, ERP modules – Finance, plant maintenance, quality management, materials management.						
Unit No. III	Unit Title **Benefits and Markets**	**9 hours**				
Reduction of Load-time, on-time, shipment, reduction in cycle time, improved resource utilization better customer satisfaction, improved supplier performance, increased flexibility, reduced quality costs, market SAP AG, Baan, Oracle, People soft, JD Edwards, SSA, QAD.						
Unit No. IV	Unit Title **Implementation**	**9 hours**				
ERP implementation lifecycle – pro-evaluation screening, package evaluation, project planning phase, gap – analysis, reengineering, configuration, implementation team training, testing, going live, end – user training, post-implementation, In-house implementation – pros and cons.						
Unit No. V	Unit Title **Future directions and case studies**	**7 hours**				
Faster implementation methodologies, business models and BAPIs. Convergence on Windows NT, application platforms, new business segment and features, some case studies.						
Reference Book: 1. Alexis Leon, "Enterprise Resource Planning", Tata McGraw Hill, 1999						
Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.					
Recommended by the Board of Studies on						
Date of Approval by the Academic Council						

Programme Elective

Subject code:	Title: **OPEN SOURCE SOFTWARE DEVELOPMENT**	LTPC	3	0	0	3
Version No.						
Course Prerequisites:	Scripting Language					
Objectives: To emphasis the concept of ERP, Various Modules and benefits of market issues.						
Expected Outcome: The students should have basic knowledge on the functions of ERP.						
Unit No. I	Unit Title: **Introduction**	**9 hours**				
Overview of Free/Open Source Software-Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement , Advantages of Free Software and GNU/Linux, FOSS usage , trends and potential - GNU/Linux OS installation- Apache , PHP, MySQL (AMP) Server installation						
Unit No. II	Unit Title: **PHP Basics**	**9 hours**				
PHP Language Basics – Integrated Development Environments for PHP – Develop and Run PHP Script using IDE – Client/Server Architecture - Variables - Data Types - Constants - Conditional Statements - Arrays - Functions.						
Unit No. III	Unit Title : **Software Development Using Database**	**9 hours**				
Introduction to Database- Database Management Systems – Oracle – DB2- PostgreSQL- MySQL Introduction – MySQL Queries - MySQL and PHP Database Manipulation (Connect, Insert, Select, Update and Delete Operations).						
Unit No. IV	Unit Title: **Advanced Concepts**	**9 hours**				
File Handling - Basic File Operations – Read, Write and Append – File Uploading with constraints - Cookie and Session – Super Globals -Email Basics – SMTP Server Configuration for Email- Sending Plain Text Email- Email with Headers – Email with Attachment.						
Unit No. V	Unit Title **:Open Source Software Deployment**	**9 hours**				
Collaborative Software Development - Introduction to Free Software Repositories – sourceforge.net- github.com – Creating New Project in Open Software Community- Maintaining and updating software using versioning system-Issue tracking (bugs, new features) – Documentation.						

Text Book :

1.Understanding Open Source Software Development, J Feller and B Fitzgerald, Addison Wesley 2002.

2.Core PHP programming, Leon Atkinson and Zeev Suraski, Pearson Education, Delhi, 2004.

Reference Book:

1. Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner, Beginning PHP, Apache,MySQL WebDevelopment, Wiley Publishing.

2. Hugh E. Williams and David Lane, Web Database Applications with PHP, and MySQL, 2nd Edition, O'Reilly,2004

Mode of Evaluation	Assignments/Quizzes/Seminars/CAT and Term-end examinations.
Recommended by the Board of Studies on	
Date of Approval by the Academic Council	