VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS)

ERODE – 12

Department of Computer Applications

Course contents, Scheme of Examination, Credits and Syllabus

(for students admitted during 2016-2017 and onwards)

DEPARTMENT OF COMPUTER SCIENCE
Bachelor of Computer Applications
Question Paper Pattern
CORE, ALLIED AND ELECTIVE PAPERS

Duration: 3.00 hrs   **Marks: 75**

Section – A   **(10 × 1 = 10 marks)**

Multiple Choice Questions - 5 (One from each unit)   (Q. No 1 – 5)

Fill in the blanks / True or false - 5 (One from each unit)   (Q. No 6 – 10)

Section – B   **(5 × 5 = 25 marks)**

Answer all the Questions   (Either or pattern)

One Question from each unit   (Q. No 11 – 15)

Section – C   **(5 × 8 = 40 marks)**

Answer five out of eight Questions

At least One Question from each unit   (Q. No 16-23)

SKILL BASED SUBJECTS

Five Questions out of **Eight**   **(5 ×15 = 75 marks)**

SELF LEARNING PAPERS AND NON MAJOR ELECTIVE

Five Questions out of **Eight**   **(5 ×20 = 100 marks)**

		Vellalar College for Women (Autonomous), Erode - 12.							
		Bachelor of Computer Applications							
		2016 - 2017 onwards							
		Course Content and Scheme of Examinations (CBCS Pattern)							
		Semester I							
Part	**Study Component**	**Subject Code**	**Title of the Paper**	**Inst. Hrs./ Week**	**Exam. Dur. Hrs.**	**Max. Marks**			**Credits**
						CIA	**ESE**	**Total**	
I	Language I	15TAMU101/ 14HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language II	13ENHU101	English	6	3	25	75	100	3
III	Core	15CSUC101/ 15CAUC101	C Programming	5	3	25	75	100	4
		15CSUCP01/ 15CAUCP01	C Programming Lab	5	3	40	60	100	3
	Allied I	11CAUA101/ 11ITUA101/ 08CTUA101	Mathematics - I (Computer Oriented Numerical Methods and Statistics)	6	3	25	75	100	5
IV	Foundation Course	09FOCU1ES	Environmental Studies	2	3		100	100	2
							Total	600	20
		Semester II							
I	Language I	15TAMU202/ 14HINU202	Tamil / Hindi	6	3	25	75	100	3
II	Language II	13ENHU202	English	6	3	25	75	100	3
II	Core	15CSUC202/ 15CAUC202	Digital Fundamentals and Architecture	4	3	25	75	100	4
		10CSUC203/ 10CAUC203	Linux and Shell Programming	4	3	25	75	100	4

		15CSUCP02/ 15CAUCP02	Linux and Shell Programming Lab	3	3	40	60	100	1
	Allied II	15CAUA202/ 15CTUA202	Mathematics - II (Optimization Techniques)	5	3	25	75	100	5
IV	Value Education	14VEDU2HR	Value Education and Human Rights	2	3	-	100	100	2
							Total	700	22

Semester III

Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	15CSUC304/ 15CAUC304	Data Structures and Algorithms	5	3	25	75	100	4
		11CSUC305/ 11CAUC305/ 11CTUC305	Object Oriented Programming with Java	5	3	25	75	100	4
		15CSUC409/ 15CAUC306	Operating System	5	3	25	75	100	4
		15CSUCP03/ 15CAUCP03/ 15CTUCP03	Java Programming Lab	5	3	40	60	100	3
	Allied III	15CSUA404/ 15CAUA303	Business Accounting	5	3	25	75	100	5
IV	Skill Based Subject I			3	3	40	60	100	3
	Basic Tamil				_	100	_	100	2
	Advanced Tamil			2	3	25	75		
	Non Major Elective II				3	-	100		
							Total	700	25

Semester IV

III	Core	16CSUC407/ 16CAUC407/ 16ITUC511/ 16CTUC304	Relational Database Management Systems	5	3	25	75	100	4
		15CSUC408/ 15CAUC408	Web Programming	5	3	25	75	100	4
		15CAUC409/ 15ITUC409/ 15CTUC613	Client/Server Computing	5	3	25	75	100	4

Part	Study Component	Subject Code	Title of the paper	Inst. Hrs./Week	Exam. Dur. Hrs.	CIA	ESE	Total	Credits
		15CSUCP04/ 15CAUCP04	Web Programming Lab	5	3	40	60	100	3
	Allied IV	15CAUA404/ 15ITUE511	Enterprise Resource Planning	5	3	25	75	100	5
IV	Skill Based Subject II	13CSUS402/ 13CAUS402/ 13ITUS402/ 13CTUS402	Multi Skill Development Paper	3	1*	40	60	100	3
	Basic Tamil				_	100	_		
	Advanced Tamil			2	3	25	75	100	2
	Non Major Elective II				3	_	100		
							Total	700	25

* ESE is an Online Examination

Semester V

Part	Study Component	Subject Code	Title of the paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	15CSUC510/ 15CAUC510	Computer Networks	6	3	25	75	100	4
		11CSUC511/ 08CAUC511/ 15ITUC306	Software Engineering	5	3	25	75	100	4
		16CSUC512/ 16CAUC512/ 16CTUC614	Android Programming	5	3	25	75	100	4
		16CSUCP05/ 16CAUCP05/ 16CTUCP06	Android Programming Lab	5	3	40	60	100	3
	Elective I	15CAUE511	Computer Graphics and Multimedia/	6	3	25	75	100	5
		15CSUE531/ 15CAUE521/ 15ITUE531/ 15CTUE521	Big Data Analytics						
		15CAUE531	E – Commerce						
IV	Skill Based Subject III			3	3	40	60	100	3
							Total	600	23

Semester VI

III	Core	11CSUE612/ 11CAUC613/ 11CTUE632	Wireless Application Protocol	5	3	25	75	100	4
		15CSUC614/ 15CAUC614	GUI Tools	5	3	25	75	100	4
		15CSUCP06/ 15CAUCP06	GUI Lab	5	3	40	60	100	3
		09CAUC6PV	Project *	6		-	100	100	5
	Elective II	08CAUE612	Software Project Management/	6	3	25	75	100	5
		15CSUC613/ 15CAUE622/ 15ITUC512	Software Testing/						
		15CSUE622/ 15CAUE632/ 15ITUE612/ 15CTUE622	Internet of Things						
IV	Skill Based Subject IV			3	3	40	60	100	3
V	Extension Activity		NSS/NCC/ Physical education/ YRC/GreenSociety/EDP/CCC	-	-	-	-	100	1
							Total	700	25
							Total (I - VI semesters)	4000	140

* Project - 80% Viva - 20%- (Both Internal and External)

SKILL BASED SUBJECTS

S.No	Subject Code	Title of the Paper
1	17CSUSP01 / 17CAUSP01/ 17ITUSP01 / 17CTUSP01	Data Management for Biological Applications - Lab (Cafeteria System)
2	13CSUS402 / 13CAUS402/ 13ITUS402 / 13CTUS402	Multi Skill Development Paper
3	16CSUSP03 / 16CAUSP03/ 16ITUSP03 / 16CTUSP03	Image Editing and Animation Tools - Lab (Cafeteria System)
4	11CSUSP04/ 11CAUSP04/ 11ITUSP04 / 11CTUSP04	DTP Design Tools - Lab (Cafeteria System)

NON MAJOR ELECTIVES

S.No	Subject Code	Title of the Paper
1	14TMLU301	Basic Tamil *
	14TMLU402	
2	14ADTU301	Advanced Tamil **
	14ADTU402	
3	11CSUNP01/11CAUNP01 /11ITUNP01/11CTUNP01	Data Processing through Excel - Lab
	11CSUNP02/ 11CAUNP02 /11ITUNP02/ 11CTUNP02	Web Designing (Dreamweaver) - Lab

* For students whose Part I in Secondary Education is not Tamil
** For students whose Part II in Higher Secondary Education is not Tamil

		SELF LEARNING PAPERS (Optional)			
S.No.	**Subject Code**	**Title of the paper**	**Exam. Dur. Hrs.**	**Max. Marks**	**Credits**
1	16CAUSL02	Internet Concepts	3	100	5
2	13AUGSL05	General Awareness	1*	100	5
3	16CSUSL15	Python	1**	100	5
4	16CSUSL25	PHP and MySQL	1**	100	5

* Online Examination

** Online Examination -Spoken Tutorial, IIT
Bombay

SEMESTER I

Core Paper I

C PROGRAMMING

Instructional Hrs: 75   **Sub. Code: 15CSUC101/**

                                                                15CAUC101

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To understand fundamental principles of Problem Solving aspects, basic concepts and develop skills for writing programs using 'C'.

UNIT I   **15 Hrs.**

    Introduction to Computer Problem Solving: Introduction – The Problem Solving Aspect – Top-Down Design. **Fundamental Algorithms:** Introduction – Exchanging the Values of Two Variables – Summation of a Set of Numbers – Factorial Computation – Generation of the Fibonacci Sequence – Reversing the Digits of an Integer.

UNIT II   **15 Hrs.**

    Overview of C – Constants, Variables, and Data Types – Operators and Expressions – Managing Input & Output Operations: Introduction – Reading a Character – Writing a Character – *Formatted Input – Formatted Output.*

UNIT III   **15 Hrs.**

    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 – *The Goto Statement.* **Decision Making and Looping:** Introduction – While Statement – Do Statement – For Statement – Jumps in Loops.

UNIT IV   **15 Hrs.**

    Arrays : Introduction – One dimensional arrays – Declaration of one dimensional array– Initialization of one dimensional arrays - Two dimensional arrays – Initializing two dimensional arrays – *Multidimensional arrays* – Dynamic arrays – More about arrays - **Character Arrays and Strings – User-defined Functions**.

UNIT V   **15 Hrs.**

Structures and Unions: Introduction – Defining a structure – Declaring structure variables – Accessing structure members - Structure initialization – Copying and comparing structure variables – Operations on individual members – Arrays of structures – Array within structures – Structures within structures – Structures and functions - *Unions* – Size of Structures - Bit fields. **Pointers.**

Note: Self study topics are denoted in *Italics*.

TEXT BOOKS

1. **R.G.Dromey,** *How to Solve it by Computer*, Pearson Education, Twelfth Impression, 2002.
2. **Balagurusamy E.** *Programming in Ansi C*, Tata McGraw-Hill Publishing Company Limited – New Delhi. Sixth Edition, 2012.

REFERENCE BOOK

Ashok N. Kamthane, *Programming and Data Structures*, Pearson Education, Pvt Ltd, New Delhi, 2009.

SEMESTER I
Practical I
C PROGRAMMING LAB

Instructional Hrs: 75   **Sub. Code: 15CSUCP01/**

                                                              15CAUCP01

Max. Marks: CIA -40; ESE -60   **Credits: 3**

Objective: To write 'C' programs for solving simple problems and implement data structures.

1. Write a program to find the sum, average, standard deviation for a given set of numbers.
2. Write a program to generate n Fibonacci nos.
3. Write a program to determine the prime numbers up to a given number.
4. Write a program to convert a decimal number into binary.
5. Write a program to multiply two matrices using functions.
6. Calculate the binomial co-efficient nCr using functions.
7. Write a program to check whether a given word is a palindrome or not.
8. Implement binary search to find a particular name in a list of names.
9. Write a program that declares and initializes a double, an int and a char. Next declare and initialize a pointer to each of the three variables. Your program should then print the address, value stored in and the memory size of each of the six variables.
10. Arrange a set of number in ascending order using Pointers.
11. Write a program to print the Student's Mark sheet assuming Register number, name, and marks in 5 subjects in a Structure. Create an array of Structures and print the mark sheet in the university pattern.
12. Write a program to count the number of alphabets, special characters and words from a line of text.

SEMESTER I

Allied I

MATHEMATICS I

(COMPUTER ORIENTED NUMERICAL METHODS AND STATISTICS)

(Derivations not included – Problems only)

Instructional Hrs: 90   **Sub. Code: 11CAUA101/**

                                              1ITUA101/08CTUA101

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objective: To gain knowledge to solve Algebraic & Transcendental Equations, Numerical Differentiation, Interpolation, Measures of central tendency, Correlation, Regression.

UNIT I   **18 Hrs.**

The Solution of Numerical Algebraic & Transcendental Equations – Bisection method – Newton-Raphson method – The method of false position.

The solution of Simultaneous Linear Algebraic Equation – Gauss Elimination method – Gauss Jordon Elimination method – Gauss Seidal method of iteration – Gauss – Jacobi method.

UNIT II   **18 Hrs.**

Numerical Differentiation – Newton's Forward Difference formula – Newton's backward difference formula – numerical Integration – Trapezoidal rule – Simpson's One-third rule – Simpson's three – eighths rule.

UNIT III   **18 Hrs.**

Interpolation – Newton forward interpolation formula – Newton backward interpolation formula – LaGrange's formula – Numerical solution of ordinary differential equations – Taylor method – Euler method – Range Kutta method.

UNIT IV   **18 Hrs.**

Measures of central tendency – Mean, Median and mode – Relation between mean, median and mode Dispersion – Range – Mean deviation & standard deviation.

UNIT V   **18 Hrs.**

Correlation – Karl Pearson's Coefficient of Correlation – Rank correlation regression – Regression – Equations – Difference between correlation & Regression.

Note: Self study topics are denoted in *Italics*.

TEXT BOOKS

1. **Kandasamy P., Thilagavathi, K. and Gunavathi S.,** Numerical Methods, S. Chand & Company Ltd. New Delhi Revised Edition 2005 (Unit I, II & III)

2. **Pillai R.S.N., Bagavathi V**, Statistics: Theory and Practice, Sultan Chand and Sons & Company Ltd. New Delhi. Reprint 2005 (Unit IV & V)

REFERENCE BOOKS

1. **Balagurusamy E.,** Numerical methods, Tata McGraw Hill, 2007.

2. **Gupta S.C., Kapoor V.K.,** Fundamental of Mathematical Statistics, Sultan Chand and Sons 2005.

3. **Rajaraman V.,** Computer oriented numerical methods, PHI Publishers, 2005.

SEMESTER I
Foundation Course A
ENVIRONMENTAL STUDIES

Instructional Hrs: 30   **Sub. Code: 09FOCU1ES**

Max. Marks: CIA -Nil; ESE -100   **Credits: 2**

Objective: To give awareness about the environment, hazards and social issues.

UNIT I   **6 Hrs.**

The multidisciplinary nature of environmental studies – Definition, Scope and importance, need for public awareness, natural resources and associated problems – forest resources, water resources, mineral resources, food resources, energy resources, land resources , role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.

UNIT II   **6 Hrs.**

Concept of an ecosystem, structure and function of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem – food chain, food webs and ecological pyramids, ecological succession.

UNIT III   **6 Hrs.**

Biodiversity and its conservation – Introduction – definition, genetic, spices and ecosystem diversity. Conservation of biodiversity – In-situ and Ex-situ conservation of biodiversity.

UNIT IV   **6 Hrs.**

Definition, causes, effects and control measures of air pollution, water pollution , soil pollution, noise pollution & Thermal pollution. Disaster management – floods, earthquake, cyclone and landslides.

UNIT V   **6 Hrs.**

Social Issues - Global warming, ozone layer depletion, acid rain, nuclear accidents and holocaust (case studies). Consumerism and waste products, Environmental Protection Act- air, water, wildlife, forest issues involved in enforcement of environmental legislation and public awareness.

FIELD WORK

Visit to a local area to document environmental assets – river / forest / grass land / hill / mountain.

Visit to a local polluted site - urban / rural / industrial / agricultural.

Study of common plants, insects, birds.

Study of simple ecosystems – pond, river, hill slope, etc.

REFERENCE BOOK

Environmental studies. Bharathiar University, Coimbatore, Published by.   Bharathiar University.

SEMESTER II

Core Paper II

DIGITAL FUNDAMENTALS AND ARCHITECTURE

Instructional Hrs. : 60

Sub. Code: 15CSUC202/
15CAUC202

Max. Marks: CIA -25; ESE -75

Credits: 4

Objective: To learn number systems and Boolean algebra, combinational and sequential circuits and basic Architecture of a Computer.

UNIT – I **12 Hrs.**

Binary Systems : Digital Computers and Digital Systems – Binary Numbers – Number base conversion – Octal and Hexadecimal Numbers – Complements – Binary Codes. Boolean Algebra and Logic gates: Basic Definitions- Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – *Boolean Functions* – Canonical and Standard Forms – Other Logic Operations – Digital Logic Gates.

UNIT – II **14 Hrs.**

Simplification of Boolean Functions: The Map method – Two and Three variable Maps – Four Variable Map – Product of Sums simplification – Don't Care Condition. Combinational Logic: Introduction – Design procedure – *Adders* – Subtractors – Code Conversion – Decoders – Multiplexers. Flip-Flop: RS Flip-Flop – JK Flip-Flop – D Flip-flop.

UNIT – III **12 Hrs.**

Input – Output Organization: Peripheral Devices - Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – *Example of I/O Interface.*

UNIT – IV **12 Hrs.**

Asynchronous data Transfer. Strobe Control and *Handshaking* – Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt – Priority Encoder – Interrupt Cycle – Software

B.C.A 2016-17 onwards

Routines – Initial & Final Operations.   Direct Memory Access: DMA Controller, DMA Transfer.

UNIT – V   **10 Hrs.**

Memory Organization: *Memory Hierarchy* – Main Memory – Auxiliary Memory - Associative memory.

Cache Memory: Associative, Direct, Set-associative Mapping – Writing Into Cache Initialization.

Note: Self study topics are denoted in *Italics*.

TEXT BOOKS

1. **Morris Mano, M.,** *Digital Logic and Computer Design*, Prentice Hall of India, 2006 **(I, II Unit)**

2**. Morris Mano, M.,** *Computer System Architecture,* Pearson Pub, III Edition, 2006 **(III, IV & V Unit).**

REFERENCE BOOKS

1. **Albert Paul Malvino, Donald P Leach,** *Digital principles and Applications*, McGrawHill, 1996**.**

2. **Carter,** *Computer Architecture,* Schaum's outline series, TMH, 2007**.**

SEMESTER II
Core Paper III
LINUX AND SHELL PROGRAMMING

Instructional Hrs: 60 **Sub. Code: 10CSUC203/**

10CAUC203

Max. Marks: CIA -25; ESE -75 **Credits: 4**

Objective: To learn the concept of Linux Operating System and shell programming

UNIT I **10 Hrs.**

Introduction to LINUX Operating System: Introduction - The LINUX Operating System.

UNIT II **10 Hrs.**

Managing Files and Directories: Introduction – Directory Commands in LINUX – File Commands in LINUX.

UNIT III **12 Hrs.**

Creating files using the vi editor : Text editors – The vi editor**. Managing Documents :** Locating files in LINUX – Standard files – Redirection – Filters – Pipes.

UNIT IV **14 Hrs.**

Securing files in LINUX: File access permissions – viewing File access permissions – Changing File access permissions. **Automating Tasks using Shell Scripts:** Introduction – Variables- Local and Global Shell variables – Command Substitution.

UNIT V **14 Hrs.**

Using Conditional Execution in Shell Scripts: Conditional Execution – The Case…esac Construct. **Managing repetitive tasks using Shell Scripts:** Using Iteration in Shell Scripts – The while construct – The until construct – The for construct – The break and continue commands – Simple Programs using Shell Scripts.

Note: Self Study Topics are denoted in *Italics*.

TEXT BOOK

Operating System LINUX, NIIT, Prentice-Hall of India Private Limited, New Delhi, 2006, Eastern Economy Edition.

REFERENCE BOOK

1. **Richard Petersen**, *Linux: The Complete Reference*, Sixth Editions, Tata McGraw-Hill Publishing Company Limited, New Delhi, Edition 2008.

2. www.spoken-tutorial.org

SEMESTER II
Practical II
LINUX AND SHELL PROGRAMMING LAB

Instructional Hrs. : 45   **Sub. Code: 15CSUCP02/**

                                                        15CAUCP02

Max. Marks: CIA -40; ESE - 60   **Credits: 1**

Objective: To get hands on experience in Shell programming.

1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.

2. Write a shell script to show the following system configuration :

    a. currently logged user and his log name

    b. current shell , home directory , Operating System type , current Path setting , current working directory

    c. show currently logged number of users, show all available shells

    d. show CPU information like processor type , speed

    e. show memory information

3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.

4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.

5. Write a shell script to implement the filter commands.

6. Write a shell script to remove the files which has file size as zero bytes.

7. Write a shell script to find the sum of the individual digits of a given number.

8. Write a shell script to find the greatest among the given set of numbers using command line arguments.

9. Write a shell script for palindrome checking.

10. Write a shell script to print the multiplication table of the given argument using for loop.

SEMESTER II

Allied Paper II

MATHEMATICS II - (OPTIMIZATION TECHNIQUES)

(Derivations Not Included – Problems Only)

Instructional Hrs: 75   **Sub. Code: 15CAUA202 /**

                                                                                 15CTUA202

Max. Marks: CIA – 25; ESE – 75   **Credits: 5**

Objective: To solve problems in Linear Programming, Transportation, Inventory Control, Replacement and Queueing Theory.

UNIT I   **14 Hrs.**

    Linear Programming: Introduction – Mathematical Formulation of the Problem – Graphical Solution – General Form of LPP – Canonical & Standard form of LPP – Simplex Method – Big-M Method .

UNIT II   **15 Hrs.**

    The Transportation Problem: Mathematical Formulation of the Problem – Initial Basic Feasible Solution (North-West Corner Rule, Minimum Cost Method, Vogel's Approximation Method) – Moving towards Optimality – Unbalanced Transportation Problems.

Assignment Problem: Mathematical Formulation of an Assignment Problem – Hungarian Assignment Method – Unbalanced Assignment Problems.

UNIT III   **16 Hrs.**

    Inventory Control: Introduction – Various Costs involved in Inventory – EOQ models without Shortage - EOQ models with Shortage - Buffer Stock & Reorder Level.

UNIT IV   **15 Hrs.**

    Replacement Problems: Introduction – Replacement of Equipments that deteriorates gradually - Replacement of Equipment that fails suddenly**. PERT – CPM**: Introduction - Rules of Network Construction – Critical Path Method – PERT Calculations.

UNIT V   **15 Hrs.**

Queueing Theory: Introduction – Characteristics of Queueing System – Traffic Intensity – Poisson Process & Exponential Distribution – Classification of Queues – Problems from Single Server Infinite and Finite Population Model.

Note : Self Study Topics are denoted in *Italics*.

TEXT BOOK

Kanti Swarup, Gupta P K & Man Mohan, *Operations Research*, S.Chand & Company Pvt. Ltd, New Delhi, 2001.

REFERENCE BOOK

Gupta P K , Hira D S, *Introduction to Operations Research*, S.Chand & Company Pvt. Ltd, New Delhi, first edition,2013.

SEMESTER II

VALUE EDUCATION: VALUE EDUCATION AND HUMAN RIGHTS

Instructional Hrs: 30   **Sub Code: 14VEDU2HR**

Max Marks: CIA – Nil; ESE-100   **Credits: 2**

Objective : To gain knowledge about Human Values, Human Rights, Human Rights Issues, Human Rights Enforcements, Indian Constitution

UNIT I   **5 Hrs.**

Aim of Value Education – Concept of Human Values-Types of Values - Components of value   education - Personal Development: *Character formation towards positive personality -* National Values

UNIT II   **5 Hrs.**

Concept and theories of Human Rights – *Classifications of Human Rights* – Universal Declaration of Human Rights- International Covenant on civil and political rights – International covenant on Economic, Social and Cultural Rights.

UNIT III   **10 Hrs.**

Rights Guaranteed by Indian Constitution - Constitutional vision of freedom: Fundamental Rights – *Fundamental duties*- Constitutional vision of Justice: Directive Principles of State policy.

UNIT IV   **5 Hrs.**

Human Rights Issues: Gender Discrimination- *Domestic violence*- Child Labour - Bonded Labour

UNIT V   **5 Hrs.**

Human Rights Enforcements : National Human Rights Commission – State Human Rights Commission – Human Rights Courts – Role of NGO's : Amnesty International, Asia Watch – *Peoples Union for Liberties(PUCL),* Peoples Union for Democratic Rights (PUDR).

Note: Self study topics are denoted in *Italics.*

REFERENCE BOOKS

1. **Mugammad Naqi**, *Modern Value Education*, Anmol Publications Pvt Ltd, New Delhi, 2007.

2. **Shrimali L.L**, *A Search for Values in Indian Education*, Vikas Publishers, Delhi, 1974.

3. **Acharya. N.K**, *The Constitution of India*, Asia Law House, Hyderabad, 2011.

4. **Misra R.**, *Human Rights* Sumit Enterprises, New Delhi, First Edition,2005.

5. **Nirmal S.J**, *Human Rights in India* ,Oxford University Press, New Delhi,2000

6. **Durgadas Basu,** *Human Rights in Constitutional Law*, Prentice Hall of India,1994.

7. **Bajwa G.S.**, *Human Rights in India*, Anmol Publications, New Delhi,1995.

SEMESTER III

Core Paper IV

DATA STRUCTURES AND ALGORITHMS

Instructional Hrs: 75   **Sub. Code: 15CSUC304**

                                                                    /15CAUC304

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To learn the concept of data structures and implement fundamental data structures.

UNIT I   **15 Hrs.**

   Introduction – Overview – *How to Create Programs - How to* Analyze Programs **Arrays** – Axiomatization – Ordered Lists – Sparse Matrices - Representation of Arrays.

UNIT II   **15 Hrs.**

   Stacks and Queues – Fundamentals – Mazing Problem - *Evaluation of Expressions* - Multiple Stacks and Queues.

UNIT III   **15 Hrs.**

   Linked lists: Singly Linked Lists – Linked Stacks and Queues – The Storage Pool – Polynomial Addition - Sparse Matrices - Doubly Linked Lists and Dynamic Storage Management.

UNIT IV   **15 Hrs.**

   Trees: Basic Terminology – Binary Trees – Binary Tree Representation – *Binary Tree Traversal* – Binary Tree Representation of Trees – **Applications of Trees:** Decision Trees. **Symbol Tables** – Hash Tables: Hashing Functions - Overflow Handling.

UNIT V   **15 Hrs.**

   Internal Sorting: Searching – Insertion Sort – Quick Sort – Two way Merge Sort – Heap Sort. **Files**: File Organizations: Sequential, Random, Linked Organizations, Inverted Files, And Cellular Partitions.

Note: Self study topics are denoted in *Italics*.

TEXT BOOKS

> **Ellis Horowitz and Sartaj Sahni,** *Fundamentals of Data Structure*, Galgothia book source, 2003

REFERENCE BOOKS

1. **Samanta**, **D.** *Classic Data structure,* Prentice Hall of India Pvt Ltd, Ninth edition, 2007.
2. **Jean-Paul Tremblay & Paul G.Sorenson,** An Introduction to *Data Structures with Applications*, Tata McGraw Hill Company, 2nd Edition, 1998.

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SEMESTER III

Core Paper V

OBJECT ORIENTED PROGRAMMING WITH JAVA

Instructional Hrs: 75

Sub. Code: 11CSUC305 /

11CAUC305 / 11CTUC305

Max. Marks: CIA -25; ESE -75

Credits: 4

Objective: To have an understanding on the concept of OOPs through Java.

UNIT I   **15 Hrs.**

       Fundamentals of Object-Oriented programming: Introduction-Object –Oriented Paradigm-Basic concepts of Object-Oriented Programming-Benefits of OOP-Applications of OOP. **JAVA Evolution:** History – Features – *How Java Differs from C and C++* - Java and Internet – Java and WWW – Web Browsers. **Overview of Java Language:** Introduction – Simple Java Program – Structure – Java Tokens – Statements – Implementing Java Program – Java Virtual Machine.

UNIT II   **15 Hrs.**

       Constants – Variables – Data Types - Operators and Expressions. *Decision Making and Branching:* If – If else, Else if ladder, Switch, ?: Operator. Decision Making and Looping: While, do, for – Jumps in Loops – Labeled Loops. Classes, Objects and Methods.

UNIT III   **15 Hrs.**

       Arrays, Strings and Vectors – **Interfaces:** *Multiple Inheritance* – Packages: Putting Classes together – Multi Threaded Programming.

UNIT IV   **15 Hrs.**

       Managing Errors and Exceptions – Introduction – Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for Debugging – Applet Programming – *Graphics Programming.*

UNIT V   **15 Hrs.**

   Files: Introduction – Concept of Streams – Stream Classes – Using Streams - I/O Classes – File Class – I/O Exceptions – Creation of Files – Reading/ Writing Characters/ Bytes – Handling Primitive Data Types – *Random Access Files*.

Note: Self study topics are denoted in *Italics*.

TEXT BOOKS

   E.Balagurusamy E., *Programming with Java* **-**A primer- TMH pub, 2'nd Edition, 2005.

REFERENCE BOOKS

1. ***John R.Hubbard*** , *Programming with Java-,* TMH Pub, 1999**.**
2. ***Patrick Naughton and Herbert Schidt***， *The Complete Reference Java 2* **-**,   3 rd Edition, TMH Pub, 2000.
3. ***Xavier C.,*** *Programming with Java 2* **-**, SciTech Pub, 2000.

SEMESTER III

Core Paper VI

OPERATING SYSTEM

Instructional Hrs. : 75   **Sub. Code: 15CSUC409/**

15CAUC306

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To learn the basic concepts and functions of Operating System.

UNIT I   **14 Hrs.**

Introduction: What is an Operating System?. **Process Concepts:** Definition of Process – Process States – Process States Transitions – The Process Control Block – *Operations of Processes* – Suspend and Resume - Interrupt Processing- **Asynchronous Concurrent Processes**: Mutual Exclusion – Critical Sections – Semaphores. **Deadlock and Indefinite Postponement.**

UNIT II   **14 Hrs.**

STORAGE MANAGEMENT

Real Storage: Real Storage Management Strategies – Contiguous Versus Non-Contiguous Storage Allocation – Single User Contiguous Storage Allocation – Fixed Partition Multiprogramming – Variable Partition Multiprogramming

Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Demand Paging – *Page Size*.

UNIT III   **15Hrs.**

PROCESSOR MANAGEMENT

Job and Processor Scheduling: Introduction – Scheduling Levels, Objectives, Criteria - Preemptive Vs Non-Preemptive Scheduling – *Priorities* – Deadline Scheduling – FIFO – RR – SJF – SRT – HRN

UNIT IV   **16 Hrs.**

AUXILIARY STORAGE MANAGEMENT

        Disk Performance Optimization: Introduction - Operation of Moving-Head Disk Storage – Need for Disk Scheduling – Characteristics of Disk Scheduling Policies - Seek Optimization – *RAM Disks - Optical Disks.*

UNIT V   **16 Hrs.**

        File and Database Systems: Introduction – The File System – File System Functions – File Organization – Allocating and Freeing Space – File Descriptor – Access Control Matrix.- Access Control by User Classes.

Case Study: LINUX: Introduction – UNIX and Linux Comparison – Process Management – File Management – Device Drivers – Security.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

        Deitel H.M, Operating Systems, 2nd Edition, Pearson Education Publication, 2003.

REFERENCE BOOK

        Achyut S Godbole, Operating System, TMH Publications, 2002.

SEMESTER - III

Practical – III

JAVA PROGRAMMING LAB

Instructional Hrs. : 75   **Sub. Code: 15CSUCP03**

                                                     15CAUCP03 / 15CTUCP03

Max. Marks: CIA -40; ESE -60   **Credits: 3**

Objective : To implement the concept of Object Oriented Programming using Java.

1. Write a Java program to Print Pascal's triangle.

2. Write a program to display multiplication table using default and argument constructors.

3. Write a program to find the area of the square, rectangle and triangle using the method of overloading.

4. Create a class Employee which includes employee number, Name, Year of experience. To accept N number of employee details, and sort it by employee name wise.

5. Write a program to extract a portion of a character string and print the extracted string.

6. Define an interface having one method that takes an integer parameter. For this method, provide two implementations: In the first one, just print the value and in the second one, print the square of the number. Try to call both the versions.

7. Create a package to calculate arithmetic operations of two numbers and another package to calculate logical operations of two numbers. Write a Java program to use these packages.

8. Write a program using threads to increment a shared variable.

9. Create a program to handle three types of exceptions.

10. Design an applet program to draw several shapes.

11. Create an applet program to draw human eyes at mouse click position

12. Write a java program to manage purchase details using Random Access file.

SEMESTER III

Allied Paper III

BUSINESS ACCOUNTING

(40% Theory, 60% Problems Only)

Instructional Hrs. 75   **Sub Code: 15CSUA404/**

                                                             15CAUA303

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objective: To understand the fundamentals of accounting and cost accounting

UNIT I   **15 Hrs.**

Accounting: Definition – Objectives – Branches of Accounting – Accounting Concepts – Conventions – *Systems of Accounting* – Rules for Double-Entry System of Book Keeping – Preparation of Journal and Ledger Accounting.

UNIT II   **15 Hrs.**

Subsidiary BOOKS Purchase Book – *Sales Book* – Purchase Return Book – Sales Return Book – Cash Book (Two Columnar only) - Petty Cash Book.

UNIT III   **15 Hrs.**

Preparation of Trial Balance – Final Accounts: *Trading, Profit and Loss Account* and Balance Sheet with Simple Adjustments.

UNIT IV   **15 Hrs.**

Depreciation: Definition - Causes of depreciation – Basic factors - Methods of Depreciation – Straight Line Method and Diminishing Balance Method (Simple Problems). Pricing of Material Issued: FIFO – LIFO – Simple and Weighted Average Method.

UNIT V   **15 Hrs.**

Cost Accounting: *Elements of Costing* – Types of Costing – Preparation of Simple Cost Sheets. Individual Bonus Plans – Halsay System and Rowan System.

Note : Self study topics are denoted in *Italics*.

TEXT BOOKS

1**. Murthy A , T.S. Reddy,** *Advanced Accountancy,* Margham Pub., 1st Edition, 2006.

2**. Jain S.P &.Narang***,* **K.L,** *Cost Accounting Principles and Practice,* Kalyani Publisher,2005.

REFERENCE BOOKS

1**. Grewal**, **T.S.,** *Double Entry Book Keeping,* Sultan Chand & Sons Publisher, 2004.

2.**Vinayakam M.N., Mani P.L., Nagarajan K.L** *Principles of Accountancy,* 3rd Edition, 2008.

SEMESTER III

Skill Based Subject I

Skill Based Subject I: **Data Management for Biological Applications - Lab**	
Sub.Code : **17CSUSP01/17CAUSP01/17ITUSP01/17CTUSP01**	
Max. Marks: 100 CIA: 40; ESE: 60	Credits: 3

Objective: **To solve Biological problems using Data management Tool**

1. Create a PIE chart to show the Blood Group of 95 Pharmacy students

Category of Blood Group	A	B	AB	O
Number of Students	49	27	15	04

2. For the data given below, calculate relative frequency and draw a bar chart with category in X axis and Relative frequency in Y axis

Blood Pressure Category	Frequency
Normal	**1206**
Pre-Hypertension	**1452**
Stage I Hypertension	**653**
Stage II Hypertension	**222**

3. Human Phenotype of 10 people is given in the table. Calculate summary statistics for Height, Weight and Age fields and create a Pivot table for the columns Sex and Hair Color.

Id	Height	Weight	Age	Sex	Hair Color
1	**163.20**	**55.71**	**23**	**Female**	**Black**
2	**164.80**	**54.26**	**24**	**Male**	**Brown**
3	**153.72**	**52.54**	**21**	**Male**	**Brown**
4	**168.60**	**51.12**	**23**	**Male**	**Red**
5	**158.24**	**54.61**	**22**	**Female**	**Brown**
6	**151.25**	**53.72**	**24**	**Male**	**Black**
7	**156.25**	**51.22**	**22**	**Female**	**Red**
8	**168.72**	**57.21**	**24**	**Female**	**Red**
9	**159.67**	**53.75**	**21**	**Male**	**Brown**
10	**166.39**	**58.56**	**22**	**Male**	**Black**

4. The size of breeding pairs of penguins is tabulated here. Check if there is correlation between the sizes of the two sexes using scatter graph and both correlation coefficients. (Use both Pearson and Spearman Correlation)

Pair	Female	Male
1	17.1	16.5
2	18.5	17.4
3	19.7	17.3
4	16.2	16.8
5	21.3	19.5
6	19.6	18.3

5. The effect of enzyme concentration on rate of a reaction was investigated with the following results.

Enzyme concentration (mM)	0	0.1	0.2	0.5	0.8	1.0
Rate (arbitrary units)	0	0.8	1.1	3.2	6.6	7.2

Plot a graph of these results, fit a straight line to the data, and find the slope of this line. Use the slope to predict the rate at an enzyme concentration of 0.7mM.

6. In a test of two drugs 8 patients were given one drug and 8 patients another drug. The number of hours of relief from symptoms was measured with the following results:

Drug A	3.2	1.6	5.7	2.8	5.5	1.2	6.1	2.9
Drug B	3.8	1.0	8.4	3.6	5.0	3.5	7.3	4.8

Find out which drug is better by calculating the mean and 95% confidence limit for each drug, then use an appropriate statistical test to find if it is significantly better than the other drug.

7. The pulse rate of 8 individuals was measured before and after eating a large meal. Find out if there is any significant change in pulse rate after eating.

Pulse rate		
Person	Before Eating	After Eating
1	105	109
2	79	87
3	79	86
4	103	109
5	87	90
6	74	78
7	73	78
8	82	89

8. The drug was administered to 500 people out of a total of 800 included in the sample to test its efficacy against typhoid. The results are shown below. Find the effectiveness of the drug against the disease.

Test the Efficiency of Drug	Typhoid	No Typhoid	Total
Administering the drug	**200**	**300**	**500**
Without Administering the drug	**280**	**20**	**300**
Total	**480**	**320**	**800**

SEMESTER III

Non Major Elective I

DATA PROCESSING THROUGH EXCEL LAB

Instructional Hrs. : 30   **Sub. Code: 11CAUNP01**

Max. Marks: CIA -Nil; ESE -100   **Credits: 2**

Objective: To Create, Edit and format Worksheet, analyze data using advanced features in Excel

1. Create a worksheet and perform the following formats for a list containing
    text, data and number.
    -   (I)   Aligning entries –Indent, Rotate etc.
    -   (II)   Formatting Borders, Date and Numbers.
    -   (III) Conditional Formatting.
    -   (IV)   Creating a custom style.

2. Create a sheet containing Nation-wide sales results for Avon Helmets-Region
    Vendor name- Helmet type, Helmet Color and total sales.
    -   (I)   Sort the data by Region, Vendor name and sales.
    -   (II) According to a custom list of Helmet Color-Red, Blue, Yellow and Green.

3. Create a sheet containing Nation-wide sales results for Avon Helmets-Region
    Vendor name- Helmet type, Helmet Color and total sales.
    -   (I)   Use Filtering on Region and Helmet type.
    -   (II) Use sub total function to count the no. of records and sum of sales for
        the filtered records.

4. Use query wizard to filter East, West Region transaction and sort them on
    Region and total sales.

5. Perform the following.

    (I) Create a list of vendor and total sales by consolidating the total sales. Compute sub totals with no detail data.

    (II) Create Subtotals by both Region and vendor within Region.

6. Create a pivot table to show the sales results by Region and Helmet type and summarize the total sales.

7. Create a pivot chart for the pivot table of total sales for the Region and Helmet types.

8. Create a pie chart to show the sales results for different Helmet type and to the following formats.

    (I) Add a Secondary axis.

    (II) Create picture markers.

SEMESTER IV

Core Paper VII

Relational Database Management Systems

Instructional Hrs: 75   Sub. Code: 16CSUC407/

16CAUC407 / 16ITUC511 / 16CTUC304

Max. Marks: CIA – 25; ESE – 75   **Credits: 3**

Objective: To learn the basic principles of database and design, basics of RDBMS,

Object Based Databases and database manipulation using SQL

UNIT I   **15 Hrs.**

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De-normalization.

UNIT II   **15 Hrs.**

Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus.

Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

*Implementing the SQL*Plus Commands using Create, Update, Alter, Drop, Rename, Truncate and Spooling*

UNIT III   **15 Hrs.**

Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure.

Writing queries to Add, Update, Delete records, Retrieving data from a table using Where and ORDERBY Clause.

UNIT IV   **15 Hrs.**

Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations. ***Designing queries using Built in functions.***

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

UNIT V   **15 Hrs.**

Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements.

Implementing the basic control structures in PL/SQL – sequential structure, selection structure and looping structure.

PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions. **PL/SQL Named Blocks :** Procedures – *Functions* – Packages –Triggers.

Declaring Cursor, Exception, Functions and Triggers.

Note: Lab activities are denoted in ***Bold Italics.***

TEXTBOOK

   Nilesh Shah, *Database Systems Using Oracle,* 2nd edition, PHI, 2008.

   (UNIT I: Chapters 1 & 2 UNIT II: Chapters 3 & 4 UNIT III: Chapters 5 & 6 UNIT IV: Chapters 10 & 11 UNIT V: Chapters 12, 13 & 14)

REFERENCE BOOKS

   1. **Arun Majumdar, Pritimoy Bhattacharya**, *Database Management Systems,* TMH, 2007.

   2. **Gerald V. Post**, *Database Management Systems,* TMH, 3rd edition. 2008.

SEMESTER IV

Core Paper VIII

WEB PROGRAMMING

Instructional Hrs. : 75   **Sub. Code: 15CSUC408/**

                                                                        15CAUC408

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To learn Web programming using HTML, CSS and JavaScript.

UNIT I   **15 Hrs.**

    Introduction: History of the Internet and World Wide Web – Key Software Trend- Object Technology – JavaScript : Object-Based Scripting for the Web.

    Introduction to HTML : Introduction - Editing HTML – Headings – Linking – *Images* – Special Characters, Horizontal Rules – Lists – Tables –Forms - – Internal Linking - Meta Element and Frameset Element.

UNIT II   **13 Hrs.**

    Cascading Style Sheets (CSS): Introduction – Inline Styles - Embedded Style Sheets - Conflicting Styles – Linking External Style Sheets – Positioning Elements – *Backgrounds* – Element Dimensions – Text Flow and Box Model – User Style Sheets – CSS3.

UNIT III   **16 Hrs.**

    Introduction to Scripting: JavaScript – Introduction to Scripting – Simple Programs - Memory Concepts – Arithmetic – Decision Making : Equality and Relational Operators –Control Structures – if Selection statement- if..else Selection Statement – while Repetition Statement – Assignment operators- Increment and Decrement Operators - Essentials of counter-controlled repetition – **for** repetition Statement – switch Multiple Selection Statement – **Do..While** Repetition Statement – The **break** and **continue** Statements – Labeled break and Continue Statements - *Logical operators*.

UNIT IV   **16 Hrs.**

Functions: Program Modules in Java Script - Programmer-Defined Functions - Function Definitions – Scope Rules – JavaScript Global Functions - *Recursion* – Recursion vs. Iteration.

Arrays: Arrays - Declaring and allocating Arrays – Examples using Arrays - References and Reference Parameters – Passing Arrays to Functions - Sorting arrays – Searching Arrays : Linear and Binary Search – Multidimensional Arrays.

UNIT V   **15 Hrs.**

Objects: Introduction to Object Technology -Math Object - String Object - Date Object - Boolean & Number Objects - Document *Object* - Window Object - using Cookies.

Events : Introduction – Registering event Handlers – Event onload – Event onmousemove, the event Object and this – Rollovers with onmouseover and onmouseout – Form Processing with onfocus and onblur – More Form Processing with onsubmit and onreset – Event Bubbling – More Events.

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

P.J.Deitel & H.M.Deitel, *Internet and World Wide Web – How to Program*, Prentice Hall of India, 2009, Fourth Edition.

REFERENCE BOOKS

1. **Deitel, Deitel & Neito**, *XML – How to Program*, Pearson Education,Asia, 2013.
2. **Shelley Powers, et al.,** *Dynamic Web Publishing Unleashed* , Second Edition, Techmedia, New Delhi,1998.
3. **Thomas A.Powell,** *HTML: The Complete Reference*, Tata McGraw Hill Second Edition, 2000.
4. **Xavier C.,** *World Wide Web design with HTML*, Tata McGraw-Hill Publishing Company, New Delhi, 2007.

SEMESTER IV

Core Paper IX

CLIENT / SERVER COMPUTING

Instructional Hrs: 75   **Sub. Code: 15CAUC409/**

15ITUC409/15CTUC613

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To learn the basic concepts of Client / Server computing, Operating Systems and SQL Database servers.

UNIT I   **15 Hrs.**

Client / Server computing - What is client / server? – File servers, database servers, Transaction servers, Groupware servers, Object servers, Web server – FAT server or client / server - Client / Server building blocks

UNIT II   **15 Hrs.**

Client / Server and operating systems – the Anatomy of a server program – Needs of Client / Server from an OS – server scalability – Client anatomy – Client and server OS trends – Client OS and server OS. NOS: Creating the single system image - Remote procedure Calls (RPC) – Messaging and Queuing: The MOM Middleware

UNIT III   **15 Hrs.**

SQL Database servers: What does SQL do? – The ISO standards – What does a database server do? – Stored procedures, Triggers and Rules. **Data warehouses** – OLTP (Online Transaction Processing) – Decision Support System (DSS) – Executive Information System (EIS) – comparing Decision Support and OLTP system – Production vs. Information Database – The data ware house

UNIT IV   **15 Hrs.**

Client / Server Transaction Processing – The ACID properties – Transaction Models – TP monitors – Client / Server groupware – Importance of Groupware – What is Groupware – The components of Groupware. Distributed Object, CORBA style – CORBA: ORB - The Anatomy of a CORBA ORB.

UNIT V   **15 Hrs.**

Web client / server – The Evolution of the Web- Client/Server, Web Style -What is URL? – Shortest HTML tutorial – HTTP – 3tier client / server – HTML web based forms – CGI: The server side of the web.

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

Robert Orfali, Dan Harkey and Jeri Edwards, Client /Server Survival Guide, Wiley India Publication Private Limited, Third Edition, 2008.

REFERENCE BOOKS

1. Nein **Jenkins,** Client / Server Unleashed, 1st Indian Edition, 1998, Tech Media.

2. Partick N.Smith, Steven L.Guengerich, Client /Server Computing, 2nd Edition, 2002, PHI.

SEMESTER IV
Practical IV
WEB PROGRAMMING LAB

Instructional Hrs: 75   **Sub. Code: 15CSUCP04/**

                                                                        15CAUCP04/

Max. Marks: CIA -40; ESE -60   **Credits: 3**

Objective: To design web pages using simple HTML, CSS and JavaScript.

1. Create a web page with
    1. Correct Structure (header and body)
    2. A title
    3. At least two different headings, with separate content following each heading
    4. An unnumbered list with at least 3 items
    5. A numbered list with at least 3 items
    6. At least 4 links to other web pages
    7. At least 1 picture
2. Create a XHTML Document using nested list with indentation

3. Create a XHTML Document using frames and images.

4. Use HTML and CSS to create a 3 column layout with a top banner section, 3 columns, and a bottom footer section. First column contains Buttons, second column shows the main content and third column contains advertisements.

5. Write CSS to make the following style changes:
    a) All elements in the body should have a white background with a text color of #330033 and the font Verdana or any serif available.
    b) The first-level headers are 40px bold serif font. The second-level headers are 24px underlined sans serif.
    c) Paragraph text and lists should have a width of 550px and a top and bottom padding of 10px.
    d) Ordered lists should have a background color of #FFCC99 and unordered lists should have a background color of #CCFFCC. All list elements should be in italics.

e) Links should never show the default underlining and upon hovering they should become neon green(#33ff33)

6. Write a recursive function GCD that returns the greatest common division of x and y. The GCD of x and y is defined recursively as follows: if y is equal to 0 then GCD(x,y) is x; otherwise GCD(x,y) is GCD(y,x%y) where % is the modulus operator. Write a XHTML document to implement this function.

7. Write a function PERFECT that determines whether the given parameter is a perfect number. Use this function in a script that determines and displays all the perfect numbers between 1 and 1000.

8. Write a program to read numeric data and sort them using bubble sort.

9. Write a program to search for a number using binary search.

10. Create a XHTML document using functions to calculate the volume of a sphere, cylinder and a cube. Use radio buttons for selecting a particular shape.

11. Write a program to read a string and use indexOf, lastIndexOf and split methods of String object.

12. Write a simple drawing program using onmousemove that allows the user to draw inside a box in red or blue by holding down the Shift or Ctrl keys.

SEMESTER IV

Allied IV

ENTERPRISE RESOURCE PLANNING

Instructional Hrs: 75   **Sub Code: 15CAUA404**

Max.Marks: CIA-25; ESE-75   **Credits: 5**

Objective: To learn fundamental concepts, manufacturing perspective, modules and benefits of ERP.

UNIT I   **15 Hrs.**

      Introduction to ERP: Introduction-Evolution of ERP-What is ERP?-Reasons for the growth of the ERP market-The advantages of ERP-why do many ERP implementations fails?-*Why are ERP packages being used now?*.

UNIT II   **14 Hrs.**

      ERP-A manufacturing perspective : Introduction-ERP-CAD/CAM-Materials Requirement Planning(MRP)-*Bill Of Material*-Closed loop MRP-Manufacturing Resource Planning(MRP-II)-Distribution Requirements Planning(DRP)-JIT and Kanban-Computer Aided Design/ComputerAided Manufacturing(CAD/CAM)-ProductDataManagement(PDM)-Data Management-Benefits of PDM-Make-To-Order(MTO) and Make-To-Stock(MTS)-Assemble-To-Order(ATO)-Engineer-To-Order(ETO)-Configure-to-Order(CTO).

UNIT III   **15 Hrs.**

      ERP Modules: Introduction–Finance-Plant Maintenance-Quality Management-Materials Management.

UNIT IV   **15 Hrs.**

      Benefits of ERP: Introduction-Reduction of Lead-Time-On-Time Shipment-Reduction in cycle Time-Improved Resource Utilization-*Better Customer satisfaction*-Improved Supplier Performance-Increased Flexibility-Reduced Quality costs-Improved Information Accuracy and Decision Making Capability.

UNIT V   **16 Hrs.**

      ERP implementation Lifecycle: Introduction-Pre-Evaluation Screening-Package Evaluation-Project Planning Phase-Gap analysis-Reengineering-Configuration-Implementation Team Training-Testing-Going Live-*End-User Training*-Post Implementation(Maintenance mode).

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

      Alaxis leon, *Enterprise Resource Planning*, Tata Mcgraw Hill, New Delhi, 2006.

REFERENCE BOOKS

1. **Mary Summer**, *Enterprise Resource Planning*, Pearson Education, 2006.
2. **Ravi Shankar, S. Jaiswal**, *Enterprise Resource Planning*, Galgolia Publication   Pvt. Ltd., New Delhi, 1999.

SEMESTER IV

Skill Based Subject II

MULTI SKILL DEVELOPMENT PAPER

Instructional Hrs: 45   **Sub. Code: 13CSUS402/ 13CAUS402/**

                                                    13ITUS402/ 13CTUS402

Max.Marks   :100 (ESE – 60; CIA – 40)   **Credits: 3**

Objective: To acquire soft skill, logical and numerical aptitude to get success in Competitive examinations and Interviews.

UNIT I   **9 Hrs.**

Communication: Question tag – Gerund and Infinitives – Spotting the errors – Vocabulary – Synonyms – Antonyms - Prepositions – Articles – One word substitution – Sentence completion.

UNIT II   **9 Hrs.**

Numerical Aptitude : Problems on numbers - Problems on Ages – Percentage - Profit and loss - Ratio & Proportion - Time & Work - Time & Distance - Simple Interest - Compound Interest.

UNIT III   **9 Hrs.**

Critical Reasoning: Logical Inference Questions and Syllogism. **Analytical Reasoning**: Arrangement problems – Family / Blood Relation Qualms – Sense of Directions – Age Doubts. **Verbal Reasoning**: Verbal Analogy (Letter series and number series only) – Coding and Decoding.

UNIT IV   **9 Hrs.**

Self Introduction - Presentation Skills - Presentation through PowerPoint – **Soft Skills** - Interpersonal Skills – Employability Skills – Soft Skills Training – Resume Preparation – Interview Tips and Questions.

UNIT V   **9 Hrs.**

Group Discussion – Importance – Types of GD – GD Skills – GD Etiquette(do's and don'ts) – Essential Elements of a GD – Movements and Gestures to be avoided in a GD - **Online Services** –Reservation –Banking –Purchases –Passport application.

REFERENCE BOOKS

1. **Hari Mohan Prasad & Uma Rani Sinha**. 2011. Objective English for Competitive Exminations. New Delhi: Tata McGraw Hill Education Private Ltd. (Unit – I)

2. **R.S. Aggarwal,** Quantitative Aptitude, S.Chand 2010. (UNIT II)

3. **Edgar Thorpe,** Test of Reasoning for Competitive Examinations –4th edition, Tata McGraw-Hill Publishing Company Limited, New Delhi. (Unit – III)

4. **R.S. Agarwal,** A Modern Approach to Verbal Reasoning (Fully Solved) – Revised Edition, S.Chand Company Limited, New Delhi, 2012. (Unit – III)

5. **M. S. Rao,** Soft Skills Enhanching Employability-Connecting Campus with Corporate, IK International Publishing House, NewDelhi, 2010. (Unit – IV)

6. **Alex.K**, Soft Skills-Know Yourself and Know the World, S.Chand Company Ltd., 2011. (Unit V)

7. Group Discussions- Pass with Flying Colours, G. K. Publications, NOIDA, 2012.

8. **Jain T.S.Upkar's** SBI Clerical Cadre Recruitment Examination. Agar Upkar P*rakashan*

SEMESTER IV

Non Major Elective II

WEB DESIGNING (DREAM WEAVER) LAB

Instructional Hrs: 30   **Sub. Code: 11CAUNP02**

Max. Marks: CIA -40; ESE -60   **Credits: 2**

Objective: To design simple web pages using Dream Weaver.

1. Design a new web site for a product of your choice. Add some file and folders and name one of the files as index.htm.

2. Create an order list, un-order list, definition list and some nested list. Try to change the text alignment, text style, text color of the above page.

3. Create a favorite link page, including links to all your favorite web site. You can either use the URL of the link as the text that displays or you can create a hyper link out of a descriptive word or phrase.

4. Insert an image into an web page and experiment with Dreamweaver's image editing tools. Try using sharpen, crapping & brightness/contrast. Then resize the image and try image re - sampling.

5. Insert a sound or movie file into a web page. Create a hyperlink to the same file. Explore how the sound or movie works differently from the linked sound or movie.

6. Create a table with text in column 1 and numbers in column 2. Try both ascending and descending sorts on both the alphabetic data in column 1 and the numeric data in column 2.

7. Insert a table and experiment with merging and splitting cells. Insert a nested table into one of the cells in standard mode or draw a nested table in layout mode.

8. Create a form to collect the user data of your choice. Format the form objects and labels with a table, so that they line up nicely. Place submit and reset buttons in the bottom row of the table and merge the cells.

REFERENCE BOOK

Betsy Bruce, Sams Teach Yourself Adobe Dreamweaver CS3, Pearson Education 2007.

SEMESTER V

Core Paper X

COMPUTER NETWORKS

Instructional Hrs: 90   **Sub. Code: 15CSUC510 /**

                                                            15CAUC510

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To learn Computer Network concepts, layers and Network Security.

UNIT I   **15 Hrs.**

    Introduction: *Uses of Computer Networks* – Network hardware – Network Software – Reference Models – The OSI Reference Model – The TCP/IP Reference Model.

UNIT II   **20 Hrs.**

    The Physical Layer: Guided Transmission Media – **The Public Switched Telephone Network:** Switching. **Data Link Layer:** Data Link Layer Design Issues – Error Detection and Correction.

UNIT III   **20 Hrs.**

    Data Link Layer: Elementary Data Link Protocols. **The Medium Access Control: Multiple Access Protocol** – The Channel Allocation Problem - Multiple Access Protocols: Carrier Sense Multiple Access Protocols – Collision-Free Protocols – Limited Contention Protocols – **Bluetooth:** Bluetooth Architecture – Bluetooth Applications – **Data link Layer Switching:** Repeaters, Hubs, Bridges, Switches, Routers and Gateways.

UNIT IV   **20 Hrs.**

    The Network Layer: Network layer Design issues – Routing Algorithms: The optimality Principle – Shortest path routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Multicast Routing – Routing for Mobile Hosts. **The Transport Layer: The Transport Service**: Services provided to the Upper Layers – Transport Service Primitives – Berkeley Sockets.

UNIT V   **15 Hrs.**

    The Transport Layer: Elements of Transport Protocols. **The Application Layer:** DNS-*The Domain name System.***Network Security:** Cryptography – Introduction to Cryptography –

Substitution Ciphers – Transposition Ciphers – **Symmetric-Key Algorithms:** DES – Public-Key Algorithms – **Digital Signatures:** Symmetric-Key Signatures – Public-Key Signatures.

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

> **Andrew S. Tanenbaum, David J. Wetherall,** *Computer Networks***,** Pearson Education, Asia, Fifth Edition 2012.

REFERENCE BOOKS

1. **Miller**, *Data and Network Communications*, Vikas Publications, 2001.

2. **William A. Shay,** *Understanding Data Communication and Networks*, Second Edition, Vikas Publications, 2001.

SEMESTER V
Core Paper XI
SOFTWARE ENGINEERING

Instructional Hrs. : 75   Sub. Code:11CSUC511/ 08CAUC511/

                                                        15ITUC306

Max. Marks: CIA -25; ESE -75   Credits: 4

Objective: To learn engineering practices in Software development methodologies and Evaluation methods.

UNIT I   **15 Hrs.**

Introduction – The Evolving Role of Software - Software Crisis – Software Myths – *Software Engineering Layered Technology-* Software Process- Software Process Models – Prototyping model- Evolutionary Software Process models.

UNIT II   **15 Hrs.**

Analysis concepts & Principles: Requirements analysis and elicitation for Software – Analysis principles - Software prototyping – Specification. Analysis Modeling: data modeling – functional modeling and information flow – *behavioral modeling*.

UNIT III   **15 Hrs.**

Design Concepts & Principles: The design process – design principles – design concepts – effective modular design. User Interface Design – The golden rules – UID – Task analyzing and modeling – Interface Design Activities – *Implementation Tools* – Design Evaluation.

UNIT IV   **15 Hrs.**

Component level design: Structured Programming – Comparison of Design notations Software Testing techniques – *Software Testing fundamentals* – Test case design - White Box testing – Basis path testing – control structure testing – Black Box testing.

UNIT V   **15 Hrs.**

Software testing strategies – A Strategic approach to Software testing - *Unit Testing* – Integration testing   – Validation testing – System testing - **Object oriented Design:** Design for Object Oriented Systems – System Design process – The object Design Process.

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

Roger S.Pressman , *Software Engineering*, 5th Edition. TMH Publishers, 2005.

REFERENCE BOOKS

1. Ian Somerville, *Software Engineering*, 6th Edition, Pearson Education Publishers, 2001.

2. Watts S. Humphery, *A discipline for Software Engineering*, Pearson Education Publishers, 2001.

SEMESTER V

Core Paper XII

CORE PAPER XII : ANDROID PROGRAMMING

Instructional Hrs. : 75   **Sub. Code :**   **16CSUC512 /**
                                                                16CAUC512 /
                                                                16CTUC614

Max. Marks : 100   **CIA - 25;**   **ESE - 75**   **Credits: 4**

Objective: To learn the appropriate tools for Android development and gain experiences in developing applications on mobile platform.

UNIT I   **15 Hrs.**

Introduction to Android Operating System: **Android - Open Handset Alliance - Android Ecosystem - Android versions - Android Activity - Features of Android - Android Architecture - Stack Linux Kernel.** Create the First Android Application**: Directory Structure.** Android User Interface**: Understanding the components of a screen.**

UNIT II   **15 Hrs.**

Designing User Interface with View: **TextView - Button - A Standard push button - ImageButton - EditText - CheckBox - ToggleButton - RadioButton and RadioGroup - Progress Bar - Autocomplete TextView - Spinner - ListView - GridView - ImageView - ScrollView - Custom Toast Alert - Time and Date Picker.** Activity: **Introduction - Intent - Intent Filter - Activity Lifecycle - Broadcast Lifecycle –Service.**

UNIT III   **15 Hrs.**

Multimedia: **Android System Architecture - Play Audio & Video - Text to Speech.** SQLite Database in Android: **SQLite Database - SQLite - Creation and Connection of the database - Extracting value from a Cursors - Transactions.**

UNIT IV   **15 Hrs.**

Telephoning and Messaging: **SMS Telephony.** Location - Based Services**: Creating the Project - Getting the maps API Key - Displaying the Map - Navigating to a Specific Location.**

UNIT V   **15 Hrs.**

JSON: **JSON - XML and JSON - Use of JSON - Syntax and rule of JSON - JSON Name/Value pairs - JSON Values - JSON Objects - JSON Arrays - JSON uses JavaScript syntax - Parsing JSON and XML.**

TEXT BOOK

Prasanna Kumar Dixit, **Android, Vikas Publishing House Pvt Ltd, 1ˢᵗ Edition, 2014.**

REFERENCE BOOK

Reto Meier, **Professional Android 4 Application Development**, **Wiley India Pvt Ltd., 2012.**

SEMESTER V

PRACTICAL LAB V : ANDROID PROGRAMMING LAB

Instructional Hrs. : 75   Sub. Code : 16CSUCP05/16CAUCP05/16CTUCP06

Max. Marks: 100   CIA: 40;   ESE: 60   Credits: 3

Objective : To create mobile apps using Android

1. Create an Android Application to demonstrate any five UI components functionality.
2. Creating Simple Converter Application in Android.
3. Creating Calculator App in Android using multiple layouts.
4. Creating Simple Android Camera Application.
5. Create an Android Application to send SMS and auto detects the value.
6. Creating Basic List View Demo in Android.
7. Creating an Audio Player using Media Player when button is clicked the following events has to occur

   (i) Play Song (ii) Pause Song (iii) Stop Song
8. Create an Android Application using Google map and add markers to your home, College and few other locations.
9. Create, insert and update records using SQLite.
10. Create a Simple Login Application using JSON data.

ELECTIVE PAPERS FOR FIFTH SEMESTER

Elective I

COMPUTER GRAPHICS AND MULTIMEDIA

Instructional Hrs: 90   **Sub. Code: 15CAUE511**

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objective: To learn graphics and multimedia fundamentals.

UNIT I   **18 Hrs.**

Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. **Attributes of Output Primitives:** Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – *Character Attributes*.

UNIT II   **18 Hrs.**

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. **2D Viewing:** The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - *2D Viewing Functions* – Clipping Operations.

UNIT III   **18 Hrs.**

Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. **Image:** Image Types – Seeing Color – Color Models – *Basic Steps for Image Processing* – Scanner – Digital Camera – Specification of Digital Images – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT IV   **18 Hrs.**

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – *Basics of Staff Notation* – Sound Card – Audio Transmission – Audio File formats and CODECs–Audio Processing Software.

UNIT V   **18 Hrs.**

   Video: Analog Video Camera – Video File Formats and CODECs –Video Editing Software.
Animation: Types of Animation – Computer Assisted Animation – *Creating Movement* – Principles of Animation – Some Techniques of Animation – Animation on the Web- 3D Animation– Rendering Algorithms.

Note: Self study topics are denoted in *Italics*.

TEXTBOOKS

1. **Donald Hearn, Pauline Baker M**., *Computer Graphics* - 2nd edition, PHI,2008. (UNIT-I: 3.1-3.6,4.1- 4.5 & UNIT-II: 5.1-5.4,6.1-6.5)
2. **Ranjan Parekh, Principles** *of Multimedia*, **Tata** McGraw Hill,New Delhi, 2011. (UNIT-III: 4.1-4.7, 5.1-5.17 & UNIT-IV: 7.1-7.4,7.8-7.14,7.18-7.20,7.22,7.28 & UNIT-V: 8.1,8.2,8.10,8.12,9.5-9.11,9.15)

REFERENCE BOOKS

1. **Amarendra N Sinha, Arun D Udai ,** *Computer Graphics* – TMH,2009.
2. **Tay Vaughan**, *Multimedia: Making It Work* – 7th edition, TMH, 2007.

ELECTIVE PAPERS FOR FIFTH SEMESTER

Elective I

BIG DATA ANALYTICS

Instructional Hrs: 90   **Sub. Code: 5CSUE531/**

15CAUE521/ 15ITUE531/15CTUE521

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objective: To understand the challenges in architectures to manage and perform analytics on big data for data intensive applications.

UNIT I   **14 Hrs.**

Introduction: Data mining and predictive analytics - The behavior and benefits of predictive models - Applications of predictive analytics - Reaping the benefits, avoiding the pitfalls - What is Big Data? - *How much value does Big Data add?* - **Using Predictive Models:** objectives - Decision making - challenge – Discussion - Override rules (business rules)

UNIT II   **18 Hrs.**

Analytics, Organization and Culture: Embedded analytics - Learning from failure - A lack of motivation - A slight misunderstanding - Predictive, but not precise - Great expectations - *Understanding cultural resistance to predictive analytics.* **The Value of Data:** What type of data is predictive of behavior? - Added value is what's important - Where does the data to build predictive models come from? - The right data at the right time - How much data do I need to build a predictive model?

UNIT III   **20 Hrs.**

Ethics and Legislation: A brief introduction to ethics - Ethics in practice - The relevance of ethics in a Big Data world - Privacy and data ownership - Data security – Anonymity - Decision making. **Types of Predictive Models:** Linear models - Decision trees (classification and regression trees) - (Artificial) neural networks - Support vector machines (SVMs) – Clustering - Expert systems (knowledge-based systems) - What type of model is best? - Ensemble (fusion or combination) systems - *How much benefit can I expect to get from using an ensemble?* - The prospects for better types of predictive models in the future.

UNIT IV   **20 Hrs.**

The Predictive Analytics Process: Project initiation - Project requirements - Is predictive analytics the right tool for the job? - Model building and business evaluation – Implementation - Monitoring and redevelopment - How long should a predictive analytics project take? **How to Build a Predictive Model** : Exploring the data landscape - Sampling and shaping the development sample - Data preparation (data cleaning) - Creating derived data - Understanding the data - Preliminary variable selection (data reduction) - Pre-processing (data transformation) - Model construction (modeling) - *Validation: Selling models into the business - The rise of the regulator.*

UNIT V   **18 Hrs.**

Text Mining and Social Network Analysis: Text mining - Using text analytics to create predictor variables - Within document predictors - Sentiment analysis - Across document predictors - Social network analysis - Mapping a social network. **Hardware, Software and All that Jazz**: Relational databases – Hadoop - The limitations of Hadoop - *Do I need a Big Data solution to do predictive analytics?* - Software for predictive analytics

TEXT BOOK

Steven Finlay. *Predictive Analytics**, Data Mining and Big Data: Myths, Misconceptions and Methods,* First Edition. Macmillan Publishers Limited, 2014.

REFERENCE BOOKS

1. **Chuck Lam,** *Hadoop In Action*, First Edition, Manning Publication. USA, 2012.

2. **Alan Gates,** *Programming Pig*, First Edition, O'Reilly Media. USA, 2011.

3. **Jimmy Lin and Chris Dyer**. *Data-Intensive Text Processing with MapReduce.* First Edition, Morgan and Claypool. USA, *2010.*

ELECTIVE PAPERS FOR FIFTH SEMESTER

Elective I

E-COMMERCE

Instructional Hrs: 90   **Sub. Code: 15CAUE531**

Max.Marks: CIA-25; ESE-75   **Credits: 5**

Objective: To learn the concepts and technologies of E-Commerce.

UNIT I   18 Hrs.

The Dawn of Manufacturing Industry: *What is E-commerce*-The Drivers-Myths you should know-Advantages and issues in E-Commerce-Benefits and limitations of the internet-Role of E-strategy-Value chain in E-commerce-integrating E-Commerce-E-Commerce business models-**The World Wide Web:** Internet Service Provider-Web fundamentals-Internet Services and Languages.

UNIT II   18 Hrs.

E-strategies And Tactics: *The building life cycle from* –From page to stage-plan the site-Define the audience and the competition-build site content –Define site structure-**Managerial and customer related issues :** Hardware,Software,Security and setup-The Design Phase-The Marketing Phase-The Fulfillment Phase-The Maintenance and Enhancement Phase.

UNIT III   18 Hrs.

Website Evaluation and Usability Testing: Anatomy of a site-Color and its Psychological Effects-Site Evaluation Criteria-Getting Personal-What's the Big Fuss over Cookies?-*What makes Website Usable?*-Site content and Traffic Management-**Hosting your Website:** Choosing an ISP-Registering your Domain.

UNIT IV   18 Hrs.

Getting The Money: Requirements for Internet- Based Payments-**How would you like to Pay?** Credits Cards-Debit Cards-Smart Cards-**E-security and USA Patriot Act:** The Virus: Computer Enemy Number One-Security Protection and Recovery-*Role of Bio-metrics*.

UNIT V   **18 Hrs.**

E-Core Values: Ethical,Legal,Taxation,and International Issues :-What is computer Ethics-Major Threats to Ethics-Improving Ethical climate-The Privacy Factor-**Legal Issues :** The question of liability-TORT Law on the internet-Copyrights,Trademarks and Tradenames-Taxation Issues-Legal disputer On the internet-WebLinking and Domain Name Disputes-*Encryption Laws.*

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Elias M.Award, *Electronic Commerce-From Vision to fulfillment,* Prentice Hall of India, New Delhi 2002.

SEMESTER V

Skill Based Subject III

Skill Based Subject III: Image Editing and Animation Tools – Lab

Sub.Code : **16CSUSP03 / 16CAUSP03 /16ITUSP03 / 16CTUSP03**

Max. Marks: 100   CIA: 40;   ESE: 60   Credits: 3

Image Editing Tool
1. Design a greeting card for birthday using different text effects.
2. Design the front page of the college calendar using gradient.
3. Create a pattern using pattern stamp tool & clone stamp tool.
4. Create a digital drawing.
5. Design a webpage layout.

Animation Tool
1. Perform simple text effect animation.
2. Create an animation using morphology.
3. Create a scene like a tree with rising sun and animate the sun.
4. Design a butterfly and make it fly.
5. Implement walking stickman.

SEMESTER VI

Core Paper XIII

WIRELESS APPLICATION PROTOCOL

Instructional Hrs: 75   **Sub. Code: 11CSUE612/**
                                                          11CAUC613/11CTUE632

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To gain knowledge in WAP Architecture, Gateways and Hosting, Security, Wireless Markup Languages and Bluetooth Technology.

UNIT I   **16 Hrs.**

Introduction to WAP: Wireless Application Protocol (WAP) overview- Work of WAP - WAP and Internet Standards-Merits and Demerits of using WAP- WAP Components.

UNIT II   **16 Hrs.**

WAP Architectural Issues: WAP Architecture- WAP Protocol stack-Wireless application environment - How does WAP work? - optimal WAP bearer - Wireless Session Protocol - Wireless Transaction Protocol - Wireless Datagram Protocol - Wireless Transport layer Security - WAP devices - WAP is based on XML - Wireless Markup Language - Mobile originated Examples of WAP Architecture - WAP Component Technologies.

UNIT III   **15 Hrs.**

WAP Gateways and Hosting: WAP Gateway - Kannel: Open source4 WAP and SMS Gateway - Requirements - External Interfaces - Internals: Hosts, Modules, Threads - Special Servers/gateways - Free hosting for WAP pages - Wireless Operating Systems - Registering a WAP domain - WAP browsers – WAP gateway services – Architecture of the WAP gateway.

UNIT IV   **13 Hrs.**

Wireless Markup Language: Wireless Markup Language – Understanding Wireless Markup Language – Functions of WAP – Necessity of an Emulator – Basic structure of WML – WML Architecture. 3G and beyond: Mobile Wireless – What is 3G? – Applications – Bluetooth Technology.

UNIT V   **15 Hrs.**

WAP Security: WLAN Security Issues: Wired Versus Wireless – Physical Security – User Authorization – Eavesdropping counter measures – Wireless Security Considerations – Security Concerns – WAP Security Roadmap – Wireless Security Risks – Firewall – Firewall and Complete Security.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Er.V.K.Jain, *Programming WAP, WAP Servlets with WML, WML Script, Smart Card and 3G*, Published by Dream tech press.

SEMESTER VI

Core XIV

GUI TOOLS

Instructional Hrs. : 75   **Sub. Code: 15CSUC614/**

                                                        15CAUC614

Max. Marks: CIA -25; ESE -75   **Credits: 4**

Objective: To gain awareness of graphical user interface concepts through Visual Basic.

UNIT I   15 Hrs.

Visual Basic Building Blocks: Forms – Using Controls – Exploring Properties – A First Look at Methods and Events, **Using Visual Basic's Default Controls**: Introduction to the Intrinsic Controls – Working with Text Box and Label – *Controls for Making Choices* – Special Purpose Controls- Working with Multiple Controls at Design time – Working with the Controls Collection – Working with Control Arrays.

UNIT II   13 Hrs.

Event Procedures: Introducing Events – Handling Events in Programs – Understanding Event Sequences, **Menus and Toolbars:** Creating Menu Bar – Creating Pop-Up Menus – Using Toolbars in Visual Basic, **Dialog Boxes:** *Message Box* – Input Box – Dialog Boxes – User defined Dialog Box.

UNIT III   16 Hrs.

Using Variables and Constants: Introduction to Variables – Variable Declarations – Variable Arrays – Option Explicit statement – Constants, **Visual Basic Programming Fundamentals:** Writing Statements – Assignment Statements – Math Operations – Strings – Formatting Results, **Control Statements :** *If statement* – Multiple If statement – For Loop – Do Loop – Debugging Programs – Error Trapping, **Managing Project:** Using Procedures and Functions – Working with Multiple Forms – Managing Components in project.

UNIT IV   16 Hrs.

Data Access Objects(DAO) : Introduction to DAO – Opening an Existing Database – Recordset types – Placing Information Onscreen – Positioning the Record Pointer – Using Filters,

Indexes, and Sorts – Modifying multiple records using loops and SQL statements – Record Manipulation (Add, Edit, Update and Delete) - *Introducing Transaction Processing*.

UNIT V **15 Hrs.**

    ActiveX Data Objects (ADO): Introducing ADO – Using the ADO Data Control – Using the DataGrid Control – *Using ActiveX Data Objects*, **Creating Reports:** Creating a Simple Data Reports – Enhancing Data Reports.

Note: Self study topics are denoted in *Italics*.

TEXT BOOK

    Brian Siler and Jeff Spotts, *Special Edition Using Visual Basic 6*, PHI Private Ltd., New Delhi, 2001.

REFERENCE BOOKS

1. **Gray cornel,** *Visual Basic 6 from the Ground up*, TMH,1st edition 2007.
2. **Scott Warner,** *Teach Yourself Visual Basic 6*, Tata McGraw Hill Edition, 2000.
3. *Visual Basic 6 Programming* by Content Development Group, TMH Publishers 2002.

SEMESTER VI
Practical VI
GUI LAB

Instructional Hrs: 75   **Sub. Code: 15CSUCP06/**

                                                                          15CAUCP06

Max. Marks: CIA - 40; ESE - 60   **Credits: 3**

Objective: To develop simple programs and applications using Visual Basic.

1. Write a code to Scroll the text "Visual Programming" from left to right and right to left on client area.
2. Write a code for adding, removing and clearing items using Dropdown Combo Box.
3. Create a simple calculator using control array.
4. Using Flex Grid Control write a program that calculate addition, subtraction, multiplication and division of numbers ranging from 1 to 12.
5. Create a Note pad using Rich Text Box. (Use the required dialog boxes)
6. Write a code to maintain an Inventory Database and Display it using Data Grid Control. (Perform Connection through Data Control)
7. Build a master form to manipulate (add, delete, update) the Train master. (Create the required Train master table)
8. Design a transaction form (new, save) for Railway ticket reservation. (Create the required Train master and Ticket_book transaction tables)
9. Build a master form to manipulate (add, delete, update) the Employee master. (Create the required Employee master table)
10. Design a transaction form (new, save) for Employee Payslip preparation. (Build the required Employee master and Payslip transaction tables)
11. Build a master form to manipulate (add, delete, update) the Student master. (Create the required Student master table)
12. Design a transaction form (new, save) for Student fees payment transaction. (Build the required Student master and Fees pay transaction tables)

ELECTIVE PAPERS FOR SIXTH SEMESTER

Elective II

SOFTWARE PROJECT MANAGEMENT

Instructional Hrs. 90   **Sub. Code: 08CAUE612**

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objective: To understand Software Project Management techniques.

UNIT I   **18 Hrs.**

Introduction to Software Project Management: Introduction – Why is Software Project Management is Important? – What is a Project? – *Software Project Vs other Types of Project* – Contract Management and Technical Project Management – Activities Covered by Software Project Management – Plans, Methods, Methodologies – Some Ways of Categorizing Software Projects. Stepwise: an Overview of Project Planning.

UNIT II   **18 Hrs.**

Programme Management and Project Evaluation: Programme Management – Managing the Allocation of Resources within Programmes – Strategic Programme Management – Creating a Programme – Aids to Programme Management – Benefits Management – Evaluation of Individual Projects – Technical Assessment – Cost-Benefit Analysis – Cash Flow Forecasting – Cost-Benefit Evaluation Techniques – Risk Evaluation. Software Effort Estimation: Where are Estimation Done? – Problem with Over and Under-Estimates – *Basic for Software Estimating* - Software Effort Estimation Techniques – Expert Judgment – Estimating by Analogy.

UNIT III   **18 Hrs.**

Activity Planning: The Objectives – When to Plan? – Project Schedules – Project and Activities – Sequencing and Scheduling Activities – *Network Planning Models.* **Risk Management:** Risk – Categories. Resource Allocations: Introduction – Nature of Resources – Identifying the Resource Requirements. **Monitoring and Control:** Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Getting the Project Back to Target – Change Control.

UNIT IV   **18 Hrs.**

Managing People and Organizing Terms: Understanding Behavior – Organizational Behavior – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – Working in Groups – Becoming a Team – Decision Making – *Leadership* – Organizational Structures – Dispersed and Virtual Teams – Influence of Culture – Stress – Health and Safety.

UNIT V   **18 Hrs.**

Software Quality: The Place of Software Quality in Project Planning – Importance of Software Quality – Defining Software Quality – ISO 9126 – Practical Software Quality Measures – Product vs Process Quality Management – External Standards – Techniques to help enhance Software Quality – *Quality Plans* – Content of a Project Plan.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Bob Hughes and Mike Cotterell, *Software Project Management*, Fourth Edition, Tata McGraw Hill Publication Company Limited, New Delhi, 2006.

ELECTIVE PAPERS FOR SIXTH SEMESTER
Elective II
SOFTWARE TESTING

Instructional Hrs: 90　　　　　　　　　　**Sub. Code: 15CSUC613/**

　　　　　　　　　　　　　　　　　　　　　15CAUE622/ 15ITUC512

Max. Marks: CIA -25; ESE -75　　　　　　　　　**Credits: 5**

Objective: To learn various software testing strategies and metrics.

UNIT I　　　　　　　　　　　　　　　　　　**18 Hrs.**

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models.

UNIT II　　　　　　　　　　　　　　　　　　**18 Hrs.**

White-Box Testing: Static Testing – *Structural Testing* –Challenges in White-Box Testing. **Black-Box Testing:** What is Black-Box Testing? - Why Black-Box Testing? –When to do Black-Box Testing? – How to do Black-Box Testing? – *Challenges in White Box Testing*.

UNIT III　　　　　　　　　　　　　　　　　　**18 Hrs.**

Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash. **System Testing:** System Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing.

UNIT IV　　　　　　　　　　　　　　　　　　**18 Hrs.**

Acceptance Testing: Acceptance Testing – Summary of Testing Phases. **Performance Testing:** Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges.

UNIT V   **18 Hrs.**

     Test Planning, Management, Execution and Reporting: Test Planning – Test Management – *Test Process* – Test Reporting – *Best Practices*.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

     Srinivasan Desikan & Gopalswamy Ramesh, *Software Testing Principles and Practices*, 2006, Pearson Education, Seventh Edition, 2009.(UNIT-I: 2.1-2.5 UNIT-II: 3.1-3.4, 4.1-4.4 UNIT III: 5.1-5.5, 6 .1-6.5(UNIT IV: 6.6-6.7, 7.1-7.6 UNIT-V: 15.1-15.6)

REFERENCE BOOKS

1. **Renu Rajani, Pradeep Oak**, *Software Testing*, TMH, Fifth Edition, 2007.
2. **William E.Perry**, *Effective Methods of Software Testing,* Wiley India, Third Edition, 2008.

ELECTIVE PAPERS FOR SIXTH SEMESTER

Elective II

INTERNET of THINGS

Instructional Hrs: 90   **Sub. Code: 15CSUE622 /**

15CAUE632/15ITUE612/ 15CTUE622

Max. Marks: CIA-25; ESE -75   **Credits: 5**

Objective: To learn IoT concepts and technologies.

UNIT – I   **14 Hrs.**

Introduction – Concepts behind the Internet of Things: The IoT paradigm- Smart objects-Bits and atoms-Goal orientation-Convergence of technologies, Internet in general and Internet of Things.

UNIT II   **18 Hrs.**

Technologies behind the Internet of Things: RFID + NFC - Wireless networks + WSN - RTLS + GPS- Agents + Multi agent systems- layers-protocols-packets- services- performance parameters of a packet network as well as applications such as web- Peer-to-peer- sensor networks, and multimedia.

UNIT III   **20 Hrs.**

Creative thinking techniques: Modifications - Combination scenarios - Breaking assumptions - Solving problems, Transport services: TCP, UDP, socket programming-Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers-Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular internet access, and Machine-to-machine.

UNIT IV   **20 Hrs.**

Mobile Networking: Roaming and handoffs-mobile IP- and ad hoc and infrastructure less networks. Real time networking: soft and real time- quality of service/information- resource reservation and scheduling and performance measurements.

UNIT V   **18 Hrs.**

IoT definitions: overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

TEXT BOOK

Lu Yan , Yan Zhang , Laurence T. Yang , Huansheng Ning.. *The Internet of Things: From RFID to the Next-Generation*, Pervasive Networked Systems, 2008.

REFERENCE BOOK

Kurose James F., Ross Keith W. *Computer networking: a top-down approach.* Fifth Edition, Boston, Mass. Pearson Co., *2010.*

SEMESTER VI

Skill Based Subject IV

DTP DESIGN TOOLS (PAGEMAKER AND CORELDRAW) LAB

Instructional Hrs: 45   **Sub. Code: 11CAUSP04**

Max. Marks: CIA - 40; ESE - 60   **Credits: 3**

Objective: To gain practical knowledge in DTP design using Pagemaker and CorelDraw.

Pagemaker

1. Prepare a Bio-data. Apply font size, tabs, alignment, indentation and Text wrap.
2. Create a greeting card for New Year.
3. Create an Advertisement for a job in well-known form.
4. Create a Newspaper Report.
5. Create a Document by importing graphic image from Clip Art.

Corel Draw

1. Create a Document. Apply different formats to design it.
2. Combine a Text in the word processor and th-e graphic in Corel draw by using Print Merge.
3. Create a Nested shapes. Apply rotation, lock and fill color options.
4. Create any design using Line Drawing Method.
5. Create an Advertisement using an object, with combine and group options.

SELF LEARNING PAPER

1. COMPUTER ETHICS

Instructional Hrs: 100   **Sub. Code: 13CSUSL01**

Max. Marks: 100   **Credits: 5**

Objective: To learn about the moral and legal issues of using computers in social context.

UNIT I

Computer Ethics: Introduction – New possibilities and Vacuum of Politics – Filling the Vacuum, Clarifying conceptual muddles – Computers and used in a Social Context, Moral and Legal Issues - Are Computer Ethical issues Unique? The role of Analogy in Computer Ethics.

UNIT II

Professional Ethics: Characteristics of professions – The system of profession – Is Computing a Profession? – Are Computer Professionals "Professionals?" – Software Engineering – Professional Relationships – Conflicting Responsibilities – Code of Ethics and professional conflicting Responsibilities – Code of Ethics of Professional conduct – Collective Responsibility.

UNIT III

Ethics and the Internet: Ethics online – Three morally significant Characteristics – Hacking Ethics – New Species of old Crime – Netiquette – Policy Approaches.

UNIT IV

Privacy: Understanding the "Computers and Privacy Issue" – Reframing the Computers and Privacy as a social Good – Legislative Background – Global perspective – proposals for Better privacy protection.

UNIT V

Property Rights in Computer Software: Definitions – The problem current legal protection – The philosophical Basis of property - Consequentiality Arguments – Conclusions from the philosophical analysis of property – software copying is immoral of illegal.

TEXT BOOK

Deborah G.Johnson, *Computer Ethics,* Pearson Education, Third Edition, 2001.

SELF LEARNING PAPER

2. INTERNET CONCEPTS

Instructional Hrs: 100   **Sub. Code: 15CSUSL02**

Max. Marks: 100   **Credits: 5**

Objective: To understand the working of various components of Internet.

UNIT – I

Understanding the Internet's Underlying Architecture: What is the Internet – How Computer Networks Send Data across the Internet – How TCP/IP Works – How Internet Addresses and Domains Work – How Routers Work.

UNIT – II

Communicating on the Internet - **How Email Works:** How Email is delivered over the Internet – How Email Software Works – How a Mailing List Works – How Email is sent between Networks – How Encryption Can Keep Email Private. **How the World Wide Web Works**: How Web Page Work – How Web Browser Work.

UNIT – III

Using the World Wide Web: How Internet Searching Works – How Google Works – How Map Sites Work – How Wikis and Wikipedia Work.

UNIT – IV

Using Common Internet Tools: How Agent Work – How Java, ActiveX and JavaScript Work – How CGI Scripting Works. **Enjoying Entertainment and Multimedia on the Internet:** How iPods, iTunes and Podcasting Work. **Shopping and Doing Business on the Internet:** Shopping on the Internet.

UNIT – V

Protecting yourself on the Internet: How firewalls Work – How Hackers can cripple the Internet and Attack your PC - How Viruses Work – How Internet Sites can invade your Privacy – The Dangers of Spyware and Phishing – Cryptography, Privacy and Digital Certificates.

TEXT BOOK

Preston Gralla, *How the Internet Works,* Pearson Education, Eighth Edition, 2012.

SELF LEARNING PAPER
3. GREEN COMPUTING

Instructional Hrs: 100   **Sub. Code: 13CSUSL03 Max. Marks: 100**   **Credits: 5**

Objective: To learn the measures in protecting environment through proper usage of Computers and components.

UNIT – I

What Is Green Computing?: Knowing What Green Computing Means - Getting Started with Green Computing - Speaking Green Jargon. **Checking Out Your Carbon Footprint**: Knowing Your Carbon Footprint ABCs - Facing the Facts - Reducing Your Footprint. **Assessing What You've Got**: Starting an Inventory of Your Computing Equipment - Understanding How You Use Devices - Working Better with What You Have- Developing computer habits that save energy - Making the Case for a New Purchase.

UNIT – II

Giving Your Computer a Green Makeover: Weighing Your Makeover Possibilities - Shrinking the Elephant on Your Desktop - Gaming and More with a Greener Video Card -Adding Memory without Ginseng - What's a Terabyte among Friends? Improving Your Laptop Battery - Greening Your Power Supply. **Buying a Green Computer**: Understanding what makes a computer green- Matching a computer to your needs- Researching Your Options - Checking Out Small, Green, Niche Computers - Making Your Purchase.

UNIT – III

Choosing Earth-Friendly Peripherals: Planning Your Purchases of Green Peripherals - Sharing Peripherals - Picking Printers - Seeing Some Specialty Drives - Selecting Keyboards and Mice - Calling Router Rooter - Making the Purchase — and What to Do Afterward.

UNIT – IV

Recycling Your Computer: Facing the e-Waste Facts - Exporting the e-Waste Problem - Seeing Reasons to Recycle Computers - Planning Your Computer's Retirement - Wiping Your

System Clean - Finding Great New Uses for an Old Computer - Going Back to the Source (Almost) - Recycling Computer Supplies, Too - Taking Local Action to Clean Up Global Computer Waste.

UNIT – V

Print Less, Breathe More - Seamless Sharing across Systems: Sharing at Home - Benefits of networking - Types of networks - Setting Up a Home Network -Securing the wireless airwaves - Sharing the Easy Stuff - Sharing printers - Sharing media files - Figuring out what it is: hardware, software, or both? - Keeping Your Footprint Low at Home - Working with backups - Cleaning things up- Monitoring your resources **Ten Best Ways to Make Your Computer Greener.**

TEXT BOOK

Woody Leonhard and Katherine Murray, *Green Home Computing for Dummies,* Wiley Publishing, Inc.

REFERENCE BOOKS

1. **John Lamb***, The Greening of IT*, IBM Press, 2009.
2. **Jason Harris,** Green *computing and Green IT Best Practices.*

SELF LEARNING PAPER

4. SECURITY IN COMPUTING

Instructional Hrs. 100   **Sub. Code: 13CSUSL04**

Max. Marks: 100   **Credits: 5**

Objective: To learn about nature of system vulnerability and measures to control it.

UNIT I

What does "Secure" Mean? – Attacks – The meaning of computer security – computer criminals – methods of defense. **Elementary cryptography:** Terminology and Background – substitution ciphers.

UNIT II

Transpositions – Making good Encryption Algorithms – The data encryption standard (DES) – The AES Encryption Algorithm – Public key encryption – The uses of Encryption.

UNIT III

Program Security: Secure programs – non malicious program errors – virus and other malicious code – controls against program threats.

UNIT IV

Security in networks: Network concept - Threats in networks – network security controls secure E-Mail.

UNIT V

Protection in General purpose operating systems: protected objects and methods of protection – control of access of general objects – File protection mechanisms – user authentication.
Database Security: Introduction to databases – security requirements. **Administering security:** security planning.

TEXT BOOK

Charles P.Pfleeger & Shari Lawrence Pfleeger, *Security in Computing,* Pearson Education, Third Edition, 2004.

SELF LEARNING PAPER

5.PYTHON

Sub.Code: **Credits: 5**

Objective: To learn and develop programs in Python through free online resources

UNIT I

Getting started with ipython - Using the plot command interactively - Embellishing a plot **-**Saving plots **-** Multiple plots **-** Additional features of IPython.

UNIT II

Loading data from files - Plotting the data - Other types of plots - Getting started with sage notebook - Getting started with symbolics.

UNIT III

Using Sage - Using sage to teach - Getting started with lists - Getting started with for - Getting started with strings - Getting started with files.

UNIT - IV

Parsing data – Statistics - Getting started with arrays - Accessing parts of arrays – Matrices

Least square fit - Basic datatypes and operators - I O- Conditionals.

UNIT - V

Loops - Manipulating lists - Manipulating strings - Getting started with tuples – Dictionaries

- Sets - Getting started with functions - Advanced features of functions - Using python modules - Writing python scripts - Testing and debugging.

Material : Video Tutorials of Spoken Tutorial, IIT Bombay

SELF LEARNING PAPER

6. PHP and MySQL

Sub.Code: **Credits: 5**

Objective: To learn and develop programs in PHP and MySQL through free online resources.

UNIT I

XAMPP in Windows - XAMPP in Linux - Echo Function - Variables in PHP - IF Statement -   Switch Statement - Arithmetic Operators - Comparison Operators - Logical Operators -   Arrays - Multi Dimensional Arrays.

UNIT II

Loops While Statement - Loops Do While Statement - Loops For Statement - Loops For..each Statement - Functions Basic - Functions Advanced - GET Variable - POST Variable - Embedding PHP.

UNIT III

Common Way to Display HTML - Common Errors Part 1, 2 & 3 - MySQL Part 1,2,3,4,5,6,7 & 8 - Simple Visitor Counter.

UNIT IV

PHP String Functions Part 1 & 2 - File Upload Part 1& 2 - Cookies Part 1 & 2 – Sessions - MD5 Encryption.

UNIT V

Sending Email Part 1, 2 & 3 - Display Images from a Directory - User Login Part 1, 2 & 3 - User Password Change Part 1, 2 & 3 - User Registration Part 1, 2, 3, 4, 5 & 6.

Material: Video Tutorials of Spoken Tutorial, IIT Bombay