VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS)

ERODE – 12

Department of Computer Applications

B.C.A. 2018-19 onwards

Course contents, Scheme of Examination, Credits and Syllabus

(for students admitted during 2018-2019 and onwards)

DEPARTMENT OF COMPUTER SCIENCE

VISION

To be a Centre of Excellence in the discipline of Computer Applications and make students the world leaders both in educational and research through effective reaching and learning.

MISSION

- To develop human resource with sound knowledge-theory and practical in the discipline of Computer Applications and the ability to apply the knowledge to the benefit of the society at large.
- To inspire the sense of Sincerity in Teaching & Learning, Nobility in Profession and Service to the society for Academic & research excellence through a continuous process of improvement.
- To generate new knowledge by engaging in cutting-edge research and to promote academic growth by offering state-of-the-art undergraduate, postgraduate.
- To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
- To make the students ready to meet the industry requirements.

BACHELOR OF COMPUTER APPLICATIONS

PROGRAM SPECIFIC OUTCOMES (PSO)

- To transform and empower women graduates to meet global challenges through holistic education in terms of recent Teaching-Learning methodologies
- To groom the graduates towards excellence through building communication skills, handling leadership challenges and negotiating career path ways
- To heighten the conscious of the graduates on socio-economic concern and to inculcate moral and ethical values to chisel them as better human being.
- To train the students on the state-of-the-art tools and techniques and facilitate them to comprehend, analyze, design and create feasible solutions/innovative products for real life problems
- Will be successful to pursue higher education and rise to the challenges of the Industry and Research.

PROGRAMME OUTCOMES

The programme aids the graduates to

PO1	Emerge with competency in the subject of Computer Applications and apply fundamental knowledge to cater to the needs of Society / Employer / Institution / Own Business Enterprise
PO2	Imbibe analytical/critical/logical/innovative thinking skills in the field of software development and an ability to use the techniques, skills, and modern computer application tools
PO3	Acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building
PO4	Work in team to build, system, component/processes to meet the desired needs of IT industries and other employment sectors
PO5	Able to design computer applications to meet desired needs within realistic constraints such as economic and ethical to design and implement by evaluating a computer-based system or program to meet desired needs

Vellalar College for Women (Autonomous), Erode - 12.									
Bachelor of Computer Applications									
2018- 2019 onwards									
Course Content and Scheme of Examinations (CBCS & OBE 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	18TAMU101 / 18HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language II	18ENHU101	English	6	3	25	75	100	3
III	Core	18CSUC101 / 18CAUC101	C Programming	5	3	25	75	100	4
		18CSUCP01/ 18CAUCP01	C Programming Lab	5	3	40	60	100	3
	Allied I	18CSUA101/ 18CAUA101/ 18ITUA101 / 18CTUA101	Mathematics - I (Numerical Methods and BioStatistics)	6	3	25	75	100	5
	Foundation Course	18FOCU1ES	Environmental Studies	2	3	-	100	100	2
							Total	600	20
Semester II									
I	Language I	18TAMU202/ 18HINU202	Tamil / Hindi	6	3	25	75	100	3
II	Language II	18ENHU202	English	6	3	25	75	100	3
III	Core	18CSUC202 / 18CAUC202/ 20DAUC202	Digital Fundamentals and Architecture	4	3	25	75	100	4
		18CSUC203 / 18CAUC203	Linux and Perl Programming	4	3	25	75	100	4
		18CSUCP02/ 18CAUCP02	Linux and Perl Programming Lab	3	3	40	60	100	1
	Allied II	18CAUA202/ 18CTUA202	Mathematics - II (Optimization Techniques)	5	3	25	75	100	5
IV	Value Education	18VEDU2HR	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	18CSUC304/ 18CAUC304	Data Structures and Algorithms	6	3	25	75	100	4
		18CSUC305/ 18CAUC305/ 18CTUC305	Object Oriented Programming with Java	5	3	25	75	100	4
		18CAUC306/ 18ITUC409/	Client/Server Computing	5	3	25	75	100	4
		18CSUCP03/ 18CAUCP03/ 18CTUCP03	Java Programming Lab	4	3	40	60	100	3
	Allied III	18CSUA404/ 18CAUA303	Business Accounting	5 (4+1**)	3	25	75	100	5
IV	Skill Based Subject I			3	3	40	60	100	3
	Non Major Elective I			2	3	-	100	100	2
							Total	700	25
Semester IV									
III	Core	18CSUC407/ 18CAUC407/ 18CTUC304	Relational Database Management Systems	5 (4+1**)	3	25	75	100	4
		18CSUC408/ 18CAUC408	Web Programming	5	3	25	75	100	4
		18CSUC409/ 18CAUC409	Operating Systems	6	3	25	75	100	4
		18CSUCP04/ 18CAUCP04	Web Programming Lab	4	3	40	60	100	3
	Allied IV	18CAUA404	Enterprise Resource Planning	5	3	25	75	100	5
IV	Skill Based Subject II	18CSUS402/ 18CAUS402/ 18ITUS402/ 18CTUS402	Multi Skill Development Paper	3	1*	40	60	100	3
	Non Major Elective II			2	3	_	100	100	2
							Total	700	25

Semester V									
Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks CIA	ESE	Total	Credits
III	Core	18CSUC510 / 18CAUC510	Computer Networks	6	3	25	75	100	4
		18CSUC511 / 18CAUC511/ 18ITUC306/ 18CTUC511	Software Engineering	5	3	25	75	100	4
		18CSUC512 / 18CAUC512	Python Programming	5	3	25	75	100	4
		18CTUC512/							
		18ITUC510							
		18CSUCP05/ 18CAUCP05/	Python Programming Lab	5	3	40	60	100	3
		18CTUCP05/							
		18ITUCP05							
	Elective I	18CAUE511	Computer Graphics and Multimedia	6	3	25	75	100	5
		18CAUE531	E – Commerce						
		18CSUE531/ 18CAUE521/ 18ITUE531/ 18CTUE521	Predictive Analytics						
IV	Skill Based Subject III			3	3	40	60	100	3
Total								600	23
Semester VI									
III	Core	18CSUC613/	Open Source Technologies	5	3	25	75	100	4
		18CAUC613/							
		18ITUC613/							
		18CTUC613							
		18CSUC614 / 18CAUC614/ 18CTUC614	Android Programming	5	3	25	75	100	4
		18CSUCP06/ 18CAUCP06/	Android Programming Lab	5	3	40	60	100	3
		18CTUCP06							
		18CAUC6PV	Project *	6	-	-	100	100	5
	Elective II	18CSUE612 / 18CAUC613/ 18CTUE632	Wireless Application Protocol	6	3	25	75	100	5
		18CAUE612	Software Project Management						
		18CAUE632/ 18ITUE612/ 18CTUE622	Internet of Things and its Applications						
IV	Skill based Subject IV			3	3	40	60	100	3
V	Extension Activity		NSS/NCC/ Physical Education/ YRC/ Green Society/ EDP/ CCC	-	-	-	-	100	1
Total								700	25
* Project 80% , Viva-20% - Both Internal & External Total (I - VI Semesters)								4000	140

SKILL BASED SUBJECTS		
S.No	**Subject Code**	**Title of the paper**
1	18CSUSP01 / 18CAUSP01 / 18ITUSP01 / 18CTUSP01	Data Management for Biological Applications- Lab [Cafeteria]
2	18CSUS402 / 18CAUS402 / 18ITUS402 / 18CTUS402	Multi Skill Development Paper
3	18CSUSP03 / 18CAUSP03 / 18ITUSP03 / 18CTUSP03	DTP DESIGN TOOLS(PAGEMAKER, PHOTOSHOP & CORELDRAW) LAB
4	18CSUSP04 / 18CAUSP04 / 18ITUSP04 / 18CTUSP04	PHP and MySQL Lab
NON MAJOR ELECTIVES		
S.No	**Subject Code**	**Title of the paper**
1	18TMLU301	Basic Tamil *
	18TMLU402	
2	18ADTU301	Advanced Tamil **
	18ADTU402	
3	18CSUNP01 / 18CAUNP01 / 18ITUNP01 / 18CTUNP01	Data Processing through Excel Lab
	18CSUNP02 / 18CAUNP02 / 18ITUNP02 / 18CTUNP02	Web Designing Lab (Dream Weaver)

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

** For students whose Part I 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	18AUGSL05	General Awareness	1*	100	5
3	18CSUSL15	R Programming (spoken Tutorial, IIT, Bombay)	1**	100	5

ADVANCED LEARNING COURSES (Optional)					
S.No.	**Subject Code**	**Title of the paper**	**Exam. Dur. Hrs.**	**Max. Marks**	**Credits**
1	18CSUAL01	Technical skills in IT	3*	100	5
2	18CSUAL02	SWAYAM courses	3*	100	5

* Online Examination

** Students who have secured on an average more than 75% of marks in the previous four semesters can appear for these examinations

MOOCs Non-Ranking Compulsory Credit Course will be introduced in Part V for UG from the Academic Year 2019-20 and Onwards.

Internship is introduced at the end of 5^{th} semester.

Bloom's Taxonomy based Assessment Pattern

Components of CIA Marks (Theory)

Tests (I & II)	Model Examination	Assignment / Seminar / Subject Viva	Total
10	10	5	25

Components of CIA Marks (Practical)

Tests (I & II) (30 Marks Each)	Model Examination (50 Marks)	Class Performance	Record	Total
10	10	15	5	40

CIA (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	4 x1 = 4	30
K1 & K2	B	Either / or	2 x 5 = 10	
K2, K3 & K4	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory (MCQ-5, Fill ups-5)	10 x1 = 10	75
K1& K2	B	Either / or	5 x 5 = 25	
K2, K3 & K4	C	Open Choice (5 out of 8)	5 x 8 = 40	

SEMESTER I

CODE	COURSE TITLE
18CSUCP01/ 18CAUCP01	C PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core Practical	40	60	-	5	70	3

Preamble

The main objective of C Programming Lab is to provide the students a strong foundation on programming concepts and its applications through hands-on training

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate branching and looping constructs	K2
CO2	Distinguish between Iteration and Recursion	K4
CO3	Construct C programs using arrays and functions	K3
CO4	Make use of Pointers in C Programs	K3
CO5	Build C programs for Biological Problems	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S
CO2	M	S	M	S	S
CO3	S	M	M	S	S
CO4	S	S	M	S	S
CO5	S	S	M	S	M

S- Strong; M-Medium; L-Low

Prerequisite

- Linux, free and open-source platform for the development of programs and applications using C.
- GCC and GNU C standard library to compile and run C programs on Linux OS.
- Text editors (gedit, vi, eclipse) to write c programming code

Practical List

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 numbers using recursion
3. Write a program to convert a decimal number into binary
4. Write a program to multiply two matrices using functions
5. Calculate the binomial co-efficient nCr using functions
6. Write a program to count the number of vowels and consonants in a given line of text using pointers
7. Implement BINARY SEARCH to find a particular name from a list
8. Write a program to generate permutations of a given string using Pointers
9. Write a program to print the Student Mark sheet assuming Register number, name, and marks in 5 subjects using Structure
10. Write a program to find palindromic nucleic acid sequences in human genome(ACTG)
11. Write a program to find the
    (i) Complementary sequence of a given DNA sequence
    (ii) Percentage of nucleotides A, C, T, G in a given DNA sequence.
12. Write a program to find the start codon **ATG**and stop codons **TAA, TAG and TGA**in a given DNA sequence (eg: look for all "ATG"s, "TAA"s, "TAG"s and "TGA"s in the sequence "AAAATGCAGAACCCATGCCCGTAA").

Web Resources

1. https://www.w3resource.com/c-programming-exercises
2. https://www.udemy.com/c-programming-laboratory

Pedagogy

Demonstration, Flipped Learning

SEMESTER I

CODE	COURSE TITLE
18CSUA101/ 18CAUA101/ 18ITUA101/ 18CTUA101	MATHEMATICS – I (NUMERICAL METHODS AND BIO STATISTICS) (Derivations not included – Problems only)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	85	5	-	5

Preamble

The objective of the course is to impart mathematical skills in matrix operations, numerical methods and statistics. The students will be trained on the applications of these methods on scientific and biological problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify and Apply the matrix operations for solving any matrix related problems	K1 - K3
CO2	Determine and apply appropriate numerical methods for solving System of Linear Equations	K2 - K4
CO3	Compare and distinguish the use of differentiation / integration methods and plan for solving scientific problems.	K3 - K4
CO4	Analyze and infer the type of data for using measures of location and measures of dispersion.	K2 - K4
CO5	Recognize and apply the correlation/regression methods for finding the association between the dependent and independent variables.	K2 - K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	S
CO2	S	S	L	M	S
CO3	S	S	L	M	S
CO4	S	S	L	M	S
CO5	S	S	L	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Matrices: Introduction – Determinant – Inverse of a Matrix – Rank of a Matrix – Eigen Values of a Matrix.

UNIT II **20 Hrs.**

System of Simultaneous Linear Algebraic Equations: Gauss Jordan and Gauss Seidal Methods. **The Solution of Numerical- Algebraic & Transcendental Equations:** Newton – Raphson Method and False Position Method.

UNIT III **20 Hrs.**

Numerical Differentiation: Newton's Forward Difference Formula – Backward Difference Formula – Lagrange's Formula for unequal intervals. **Numerical Integration:** Trapezoidal Rule & Simpson's Rule (1/3 only).

UNIT IV **15 Hrs.**

Introduction to Biostatistics: Definition- Types of statistics- Applications and uses of Biostatistics- Types of variables- Identification of the type of variable. **Measures of Central Tendency:** Measures of location- Mode- Median- Mean. **Measures of Spread:** Range- Interquartile range- Standard deviation. **Case Study:** Data analysis using Measures of Central Tendency.

UNIT V **20 Hrs.**

Correlation: Definition- Types of correlation- Calculation of correlation coefficient by definitional and computational formula. **Regression:** Definition- Meaning of regression and Regression coefficient. **Case Study:** Data analysis using Correlation and Regression.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vital P. R	Allied Mathematics	Margham Publication	2012
2.	Venkataraman M. K.	Numerical Methods in Science & Engineering	National Publisher	2013 Third Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Balagurusamy. E	Numerical Methods	Tata McGraw Hill	2008, 25th Edition
2.	Manju Pandey	Biostatistics Basic and Advanced	MV Learning	2015

Ebook

1. S. B. Bhise, R. J. Dias, K. K. Mali, P.H. Ghanwat, "Textbook of Computer Applications and Biostatistics", Jan 2011 Chapter.

Web Resources

1. https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php
2. https://www.tutorialspoint.com/statistics/index.htm
3. http://www.ece.mcmaster.ca/~xwu/part6.pdf

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

Foundation Course A

ENVIRONMENTAL STUDIES

Instructional Hrs. : 30 **Sub. Code :18FOCU1ES**

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

Objective : To get awareness about the environmental 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.S

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

REFERENCE BOOK

Bharathiar University, *Environmental studies*, Published byBharathiar University,Coimbatore.

SEMESTER II

CODE	COURSE TITLE
18CSUC202/ 18CAUC202	DIGITAL FUNDAMENTALS AND ARCHITECTURE

Category	CIA	ESE	L	T	P	Credit
Core	25	75	56	4	-	4

Preamble

On successful completion of this subject the student should have knowledge on fundamental concepts, digital circuits, number system, Boolean functions, interfacing of various components and Memory Organization.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge on number systems and Boolean algebra	K2
CO2	Interpret logic functions, circuits, truth tables, and Boolean algebra expressions for logic gates	K3
CO3	Simplify the Boolean expressions and circuits using Karnaugh Maps	K3
CO4	Outline the fundamentals of combinational logic design, Flip-Flop, computer buses, I/O Peripherals and various data transfer techniques	K2
CO5	Outline the concept of Memory Organization and mapping Techniques	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	S	S	M	M
CO3	S	M	M	M	S
CO4	S	L	S	S	M
CO5	S	M	M	S	L

S- Strong; M-Medium; L-Low

Syllabus

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 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.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Morris Mano M	Digital Logic and Computer Design	Prentice Hall of India	2006, 1st Edition
2.	Morris Mano M	Computer System Architecture	Pearson Publication	2006, 3rd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Albert Paul Malvino& Donald P Leach	Digital Principles and Applications	McGrawHill	1996, 5th Edition
2.	Carter	Computer Architecture	TMH	2007, 2nd Edition

Web Resources

1. https://www.tutorialspoint.com/computer_logical_organization
2. http://www.ee.ncu.edu.tw/~jfli/computer/lecture/ch05.pdf

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSUC203/ 18CAUC203	LINUX AND PERL PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	55	5	-	4

Preamble

This course will prepare students to learn about the Linux Operating System - structure, concepts and commands. Student will be able to write simple shell programming using Linux utilities, pipes and filters. Student will learn fundamentals of Perl programming and write Perl scripts using array, hash data structures, file and regular expressions.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain the structure of Linux Operating System	K2
CO2	Develop Linux utilities to perform File processing, Directory handling, User Management and display system configuration	K3
CO3	Develop shell scripts using pipes, redirection, filters and Pipes	K2
CO4	Understand the concepts of process, backup and compression	K3
CO5	Develop Perl scripts using array, hash data structures and Regular expressions	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	M	S	S	S
CO3	S	M	M	S	S
CO4	S	S	S	S	M
CO5	S	L	M	M	M

S-Strong; M-Medium; L-Low

Syllabus

UNIT I **10 Hrs.**

Introduction to LINUX Operating System: Introduction - The LINUX Operating System. **Managing Files and Directories**: Introduction – Directory Commands in LINUX – File Commands in LINUX.

UNIT II **10 Hrs.**

Creating files using the vi editor: Text editors – The vi editor. **Managing Documents**: Locating files in LINUX – Standard files – Redirection – Filters – Pipes. **Securing files in LINUX**: File access permissions – viewing File access permissions – Changing File access permissions.

UNIT III **15 Hrs.**

Automating Tasks using Shell Scripts: Introduction – Variables- Local and Global Shell variables – Command Substitution. **Using Conditional Execution in Shell Scripts**: Conditional Execution – 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 – Parameter handling in shell scripts - Simple Programs using Shell Scripts.

UNIT IV **15 Hrs.**

Controlling Process Execution : Requesting for background processing – Checking a background process – the top command – Terminating a background process – Finding the time taken to complete a command **Backing up, Restoring & Compressing Files** : Need for making backups – Selecting a Backup medium – Mounting and Unmounting a file system – Compressing Files.

UNIT V **10 Hrs.**

Introduction to PERL: Introduction – Program Structure – Perl variables – Loops and Conditionals – Iteration – Files in Perl – Perl Subroutines – die-exit on error-Pattern matching and extraction.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	NIIT	Operating System LINUX	Prentice-Hall of India Private Limited	2009, Eastern Economy Edition
2.	N.B. Venkateswarlu	Introduction to Linux: Installation and Programming	BS Publications	2008,1st Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Richard Petersen	Linux: The Complete Reference	Tata McGraw-Hill Publishing Company Limited, New Delhi	2008, 6th Edition

Web Resources

1. http://spoken-tutorial.org/
2. https://www.tutorialspoint.com/perl/index.htm

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSUCP02/18CAUCP02	LINUX AND PERL PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core Practical	40	60	-	-	45	1

Preamble

The student will be able to create programs in the Linux environment using Linux utilities and commands. Student is given an introduction of Perl Programming and they will be able to write Perl scripts.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Develop Linux utilities to perform File processing, Directory handling and User Management	K3
CO2	Develop shell scripts using pipes, redirection, filters and Pipes	K3
CO3	Develop shell scripts to display system configuration	K3
CO4	Develop simple Perl scripts	K3
CO5	Develop simple Perl scripts applicable to Bioinformatics	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

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 display calendar for a specified month or a range.
4. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
5. Write a shell script to implement the filter commands.
6. Write a shell script to find the frequency of nucleotides in a given sequence.
7. Write a shell script to find the greatest among the given set of numbers using command line arguments.
8. Write a Perl script to find for a motif in protein sequences stored in a file.
9. Write a Perl script to use Array and Hash data structure.
10. Write a Perl script to read a file and count the number of lines containing or not containing certain words.

Pedagogy

Lecture, PPT, Quiz

SEMESTER II

CODE	COURSE TITLE
18CAUA202/18CTUA202	MATHEMATICS – II (OPTIMIZATION TECHNIQUES)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	70	5	-	5

Preamble

The objective of the course is to understand the mathematical tools needed to solve optimization problems. It is an analytical method of problem-solving and decision-making that is useful in the management of organizations.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Define the basic skills and knowledge of operations research to solve Linear Programming Problem.	K_2
CO2	Relate and solve different Transportation Models to find the feasible and optimum solutions and apply Hungarian method for assignment problems.	K_3
CO3	Describe various costs in Inventory and apply EOQ models with shortage and without shortage in Inventory control	K_3
CO4	Examine the appropriate period for replacement of equipments and analyze new simple models, like CPM and PERT to improve decision-making and develop critical thinking.	K_3
CO5	Analyze the characteristics and classification of queueing system and apply them to the problems of finite/infinite models.	K_3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	M	S	M
CO3	S	S	M	M	S
CO4	M	M	M	S	S
CO5	S	M	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

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.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	KantiSwarup, Gupta P K & Man Mohan	Operations Research	S.Chand& Company Pvt. Ltd, New Delhi	2014 , 17th Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	Prem Kumar Gupta , Hira D S	Problems in Operations Research	S.Chand& Company Pvt. Ltd, New Delhi	Reprint 2007,1st Edition

Web Resources

1. http://personal.maths.surrey.ac.uk/st/J.F/chapter7.pdf
2. http://web.tecnico.ulisboa.pt/mcasquilho/compute/_linpro/TaylorB_module_b.pdf
3. http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_qt.pdf
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5579525

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

VALUE EDUCATION: VALUE EDUCATION AND HUMAN RIGHTS

Instructional Hrs: 30 **Sub Code: 18VEDU2HR**

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. **MugammadNaqi,** 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. **DurgadasBasu,** 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

CODE	COURSE TITLE
18CSUC304/ 18CAUC304	DATA STRUCTURES AND ALGORITHMS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	85	5	-	4

Preamble

The objective of the course is to introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of data structures and algorithms	K1-K2
CO2	Construct and analyze of stack and queue operations with illustrations	K2-K4
CO3	Enhance the knowledge of Linked List and dynamic storage management.	K2-K3
CO4	Demonstrate the concept of trees and its applications.	K2-K3
CO5	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations.	K1-K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	M

CO2	S	S	M	M	S
CO3	M	M	L	M	S
CO4	S	S	L	M	M
CO5	S	M	L	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Introduction: Overview – SPARKS- Phases in Creating Programs - Analyzing Programs. **Arrays:** Axiomatization – Ordered Lists – Sparse Matrices - Representation of Arrays.

UNIT II **16 Hrs.**

Stacks and Queues: Fundamentals – Mazing Problem - Evaluation of Expressions - Multiple Stacks and Queues. **Applications of Stacks and Queue**s: Towers of Hanoi, Simulation.

UNIT III **18 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 **24 Hrs.**

Trees: Basic Terminology – Binary Trees – Binary Tree Representation – Binary TreeTraversal – Binary Tree Representation of Trees – Applications of Trees: Decision Trees. **Internal Sorting:** Searching – Linear Search, Binary Search, Fibonacci Search – Insertion Sort – Quick Sort – Two way Merge Sort – Heap Sort – Radix Sort.

UNIT V **17 Hrs.**

Symbol Tables: Static Tree Tables-Hash Tables: Hashing Functions -Overflow Handling. **Files:** File Organizations: Sequential, Random, Linked Organizations, Inverted Files, Cellular Partitions.

Text Books

S.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ellis Horowitz and SartajSahni	Fundamentals of Data Structures	Galgotia Book Source	2003

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jean-Paul Tremblay & Paul G.Sorenson	An Introduction to Data structures with Applications (for Applications of Stacks and Queues only)	Tata McGraw Hill Company	2008, 2nd Edition.
2.	Samanta.D	Classic Data Structure	Prentice Hall of India Pvt Ltd	2007, 9th Edition
3.	Seymour Lipschutz	Data Structures	McGrawHill Publications	2014, 1st Edition
4.	S.Lovelyn Rose R.Venkatesan	Data Structures	Wiley India Private Limited	2015, 1st Edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUC305 / 18CAUC305 / 18CTUC305	OBJECT ORIENTED PROGRAMMING WITH JAVA

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

The objective of the course is to train the students to acquire problem-solving skills through object oriented programming

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the concept of object oriented programming through Java	K1, K2
CO2	Illustrate the syntax and semantics of Java	K2
CO3	Apply the concept of Inheritance, Modularity, Concurrency, Exceptions handling and data persistence to develop java program	K3
CO4	Develop java programs for applets and graphics programming	K3
CO5	Understand the fundamental concepts of AWT controls, layouts and events	K1,K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	M	S	S
CO3	S	S	M	M	S
CO4	S	M	M	M	M
CO5	S	M	M	S	M

S - Strong; M - Medium; L – Low

Syllabus

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. Constants – Variables – Data Types - Operators and Expressions.

UNIT II **15 Hrs.**

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. Arrays, Strings and Vectors.

UNIT III **15 Hrs.**

Interfaces: Multiple Inheritance – **Packages:** Putting Classes together – Multi Threaded Programming. **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.

UNIT IV **15 Hrs.**

Applet Programming – Graphics Programming. **Files:** Introduction – Concept of Streams – Stream Classes – Using Streams - I/O Classes – File Class – I/O Exceptions – Creation of Files – Reading/ Writing Characters/ Bytes.

UNIT V **15 Hrs.**

Introducing the AWT: AWT Classes - Window fundamentals. **Using AWT Controls, Layout Managers and Menus:** AWT Control Fundamentals – Labels - Using Buttons - Applying Check Boxes-Checkbox group - Choice controls - Using Lists- Using a TextField- Using a TextArea - Understanding Layout Managers: Flow layout-Border layout. **Event Handling:** Introduction-The MouseEvent Class.

TEXT BOOKS:

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Balagurusamy E.	Programming with Java - A primer	TMH pub	5th Edition, 2017
2.	Herbert Schildt	Java: The Complete Reference	McGrawHill Education, Oracle press	10th Edition, 2018

REFERENCE BOOKS:

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	John R. Hubbard	Programming with Java	TMH Pub	2nd Edition, 2012
2	Patrick Naughton and Herbert Schildt	The Complete Reference Java 2	TMH Pub	3rd Edition, 1999

Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.slideshare.net/
4. https://www.w3schools.in/java-tutorial/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CAUC306/18ITUC409	CLIENT/SERVER COMPUTING

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

This course focuses on fundamental concepts of client/server technology and SQL database servers. It also provides a deep understanding of web based client-server programming.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Explain client-server computing and types of servers	K2
CO2	Examine the client/server capabilities of current crop of operating system.	K3
CO3	Explore the database server model of client/server.	K2
CO4	Understand the TP monitor and distributed object model of client/server.	K2
CO5	Demonstrate the web based client/server programming	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	M
CO2	M	S	L	M	L
CO3	M	M	S	L	S
CO4	M	M	M	M	S
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

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.

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Robert Orfali, Dan Harkey and Jeri Edwards	Client /Server Survival guide	Wiley India Edition	2008 3rd Edition

REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Nein Jenkins	Client / Server Unleashed	Tech Media	1998 1st Indian Edition
2.	ParticknN.Smith, Steven L.Guengerich	Client /Server Computing	PHI	2002 2nd Edition

Web Resources

1. https://www.webopedia.com/Computer_Science/Client_Server_Computing
2. https://www.tutorialspoint.com/Client-Server-Computing
3. https://gradestack.com/Gate-Computer-Science-/Web-Technologies/Basic-Concepts-Of-Client/21104-4273-47588-study-wtw
4. https://www.w3schools.com/html/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUCP03/ 18CAUCP03 / 18CTUCP03	JAVA PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60	-	5	55	3

Preamble

The main objective of JAVA Programming Lab is to provide the students a strong foundation on programming concepts and its applications through hands-on training

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K2
CO2	Develop Java programs using Strings, Interfaces and Packages	K3
CO3	Construct Java programs using Multithreaded Programming and Exception Handling	K3
CO4	Build Java programs for Applets and Graphics programming	K3
CO5	Create data files and Design a page using AWT controls &MouseEvents in Java programming	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	M	S	S	M
CO3	S	M	M	M	S
CO4	S	M	M	M	M
CO5	S	S	M	M	M

S - Strong; M - Medium; L – Low

Prerequisite

- Linux, free and open-source platform for the development of programs and applications using JAVA.
- Text editors (eclipse) to write JAVA programming code.

Practical List

1. Write a program to display multiplication table using default and argument constructors.
2. Write a program to find the area of the square, rectangle and triangle using the method of overloading.
3. 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.
4. Write a program to extract a portion of a character string and print the extracted string.
5. 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.
6. 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.
7. Write a program using threads to increment a shared variable.
8. Design an applet program to draw several shapes.
9. Write a program to read and write the contents from one file to another file and handles exceptions.
10. Write a program to design a Form using any three AWT controls and MouseEvents.

Web Resources

1. https://www.w3resource.com/java-exercises/
2. https://www.udemy.com/introduction-to-java-programming/

Pedagogy

Demonstration, Flipped Learning

SEMESTER III

CODE	COURSE TITLE
18CSUA404/ 18CAUA303	Business Accounting (40% Theory & 60% Problems only)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	55	5	15	5

Preamble

The objective of the course is to impart accounting skills in Final Accounting and Cost Accounting. The students will be trained on the preparation of final accounts and cost sheet using an accounting package.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify and Apply the appropriate accounting rules for the preparation of Journal and method of posting the same into Ledger	K1 - K3
CO2	Select, Classify, Choose and Categorize the given entries to enter in appropriate subsidiary books	K1 - K4
CO3	Classify, Apply and Build various financial statements like Trial Balance, Trading, P&L account and Balance Sheet	K2 - K4
CO4	Define, Explain and Apply appropriate depreciation method to prepare Machinery Account	K1 - K3
CO5	Classify the elements of cost and Construct the Cost Sheet accordingly	K2 - K3
CO6	Apply the knowledge and skill of preparation of various accounting concepts using an accounting package	K2 - K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	-	-	S	M	M
CO2	-	-	S	M	M
CO3	-	-	S	M	M
CO4	-	-	S	M	M
CO5	-	-	S	M	M
CO6	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

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. Hands on training.

UNIT II **15 Hrs.**

Subsidiary Books: Purchase Book – Sales Book – Purchase Return Book – Sales Return Book – Cash Book (Two Columnar only) - Petty Cash Book. Hands on training.

UNIT III **15 Hrs.**

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

UNIT IV **15 Hrs.**

Accounting Package: Features – Home Screen – Accounts Info Menu – Display Menu. Company Creation – Alteration & Deletion of Company – Selection of Company – Ledger Creation – Preparation of Trial Balance & Final accounts.

UNIT V **15 Hrs.**

Depreciation: Definition - Causes of depreciation – Basic factors - Methods of Depreciation – Straight Line Method and Diminishing Balance Method (Simple Problems). **Cost Accounting**: Elements of Costing – Types of Costing – Preparation of Simple Cost Sheets.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Murthy.A, & Reddy .T.S.	Advanced Accountancy	Margham Publications	Second edition, 2012
2.	Jain S. P &. Narang, K.L,	Cost Accounting Principles and Practice	Kalyani Publishers	Twenty Third edition, 2012

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Grewal, T.S.	Double Entry Book Keeping	Sultan Chand & Sons Publisher	2004
2.	VinayakamM.N., Mani P.L., Nagarajan K.L,	Principles of Accountancy	Sultan Chand & Sons Publisher	3rd Edition, 2008

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

Skill Based Subject I: Data Management for Biological Applications - Lab		
Sub.Code : 18CSUSP01/18CAUSP01/18ITUSP01/18CTUSP01		
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 using chi-square test Chi-square ($\chi 2$) table value at 5% level is 3.84

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: 18CSUNP01**

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

Objective: To create, edit and format Worksheet, analyze data using advanced features in Excel

1. Enter the following data and save it in grade .xls

Name	Marks1	Marks2	Marks3	Total	Percentage	Grade
Amit	80	70	80			
Renu	70	60	90			
Rajeev	60	50	80			
Manish	50	30	90			
Sanjeev	40	40	80			
Anita	70	70	90			

Do the following

(a) Compute the total marks and percentage of each student by entering appropriate formula.

(b) Draw a border around the worksheet

(c) Change the font size of heading to 14 points and underline it and hide column c

(d) Increase the width of column A to 15 characters

(e) Right Align the values in column B, C, F

2. Create a sheet containing Nation-wide sales results for Avon Helmets-Region, Vendor name, Helmet type, Helmet Color and Total sales.

    a. Sort the data by Region, Vendor name and sales.
    b. Sort the data 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.

a. Use Filtering on Region and Helmet type.
b. Use subtotal function to count the number 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

a. Create a list of vendor and total sales by consolidating the total sales.
b. Compute sub totals with no detail data.
c. 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 bar chart to show the sales results for different Helmet type and to the following formats.

a. Add a Secondary axis.
b. Create picture markers.

SEMESTER IV

CODE	COURSE TITLE
18CSUC407/ 18CAUC407/ 18CTUC304	RELATIONAL DATABASE MANAGEMENT SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	55	5	15	4

Preamble

The objective of the course is to present an introduction to Relational Database Management Systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a RDBMS using Oracle9i and PL/SQL

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization	K1 – K2
CO2	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment	K1 – K3
CO3	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	K2 - K4
CO4	Understand and use built-in functions and enhance the knowledge of handling multiple tables	K1 – K3
CO5	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions	K1 – K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	M
CO2	S	S	L	M	S
CO3	S	M	L	M	S
CO4	S	S	L	M	M
CO5	S	M	L	M	M

S- Strong; M-Medium; L-Low

Syllabus

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 Named Blocks : Procedure – Function, Package and Trigger

Declaring Functions and Triggers.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Nilesh Shah	Database Systems Using Oracle	PHI	2008, 2nd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	ArunMajumdar, Pritimoy Bhattacharya	Database Management Systems	Tata McGraw Hill	2007
2.	Gerald V. Post	Database Management Systems	Tata McGraw Hill	2008, 3rd Edition

Ebook

1. Diana Lorentz, "Oracle® Database SQL Reference", ORACLE, Dec, 2005.
2. Bill Pribyl, Steven Feuerstein, "Oracle PL/SQL Programming", O'Reilly Media, Inc., 6th Edition, February 2014.

Web Resources

1. http://www.digimat.in/nptel/courses/video/106105175/L01.html
2. https://www.tutorialspoint.com/oracle_sql/index.htm

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CSUC408/ 18CAUC408	WEB PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

This course aims at exploring the knowledge to the student to understand the web-development techniques that use HTML, CSS and JavaScript as a web development essentials and advanced technique of web programming.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of XHTML document and create a basic web page using forms and Tables.	K2
CO2	Create document with different styles and Identify the positioning of web page elements using Cascading Style Sheets.	K2
CO3	Understand the basic concepts of JAVA SCRIPT.	K3
CO4	Describe the concept of Arrays and Functions.	K3
CO5	Develop applications using Objects and Events.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	M	M	S	M
CO3	M	S	M	S	L
CO4	S	M	S	M	S
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

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 – Headers – Linking – Images –Special Characters, Horizontal Rules – Unordered Lists – Nested and Ordered List- Basic HTML Tables – Basic HTML Forms – Internal Linking - Frameset Tag- Nested Frameset Tags.

UNIT II **15 Hrs.**

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

UNIT III **15 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 **15 Hrs.**

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

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 – Multiple-Subscripted Arrays.

UNIT V **15 Hrs.**

Objects: Introduction to Object Technology -Math Object - String Object - Date Object - Boolean & Number Objects.

Events : Introduction –Event ONCLICK – Event ONLOAD – Tracking the mouse with Event ONMOUSEMOVE – Rollovers with ONMOUSEOVER and ONMOUSEOUT – Form Processing

with ONFOCUS and ONBLUR – More Form Processing with ONSUBMIT and ONRESET – More DHTML Events.

Text Book:

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	H.M.Deital, P.J.Deital&T.R.Nieto	Internet and World Wide Web – How to Program	Pearson Prentice Hall of India	2012, Fourth Impression

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Shelley Powers, et al.,	Dynamic Web Publishing Unleashed	Techmedia, New Delhi	1998, 2nd Edition
2.	Thomas A.Powell,	HTML: The Complete Reference	Tata McGraw Hill	2000, 2nd Edition,
3.	Xavier C	World Wide Web design with HTML	Tata McGraw-Hill	2007 1nd Edition

Web Resources

1. http://www.webbasedprogramming.com
2. https://www.w3schools.com

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CSUC409/ 18CAUC409	OPERATING SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core Paper	25	75	85	5	-	4

Preamble

The course provides a high-level understanding of the basic concepts and some knowledge of the services provided by the operating system.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of a process and its states	K1
CO2	Acquire the knowledge of real storage and virtual storage	K2
CO3	Procure the facts of processor scheduling by means of various scheduling algorithms	K2
CO4	Understand the basic operations on primary and secondary storage disks	K3
CO5	Get awareness about the functions of a file system. Able to relate UNIX and LINUX operating system	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	M	S	S	M	S
CO3	S	M	S	M	M
CO4	M	M	S	S	S
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **18 Hrs.**

Introduction: Operating System. **Process Concepts:** Definition of Process – Process States – Process States Transitions – The Process Control Block – Operations of Processes – Suspend and Resume - Interrupt Processing - Semaphores. **Deadlock and Indefinite Postponement**.

Hands-on Exercise: Process- Create, Delete, Suspend and Resume a thread, Deadlock in Multithreading.

UNIT II **18 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.

Hands-on Exercise: Best Fit algorithm in Memory Management.

UNIT III **18 Hrs**.

PROCESSOR MANAGEMENT

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

Hands-on Exercise: Programming FIFO method.

UNIT IV **18 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.

Hands-on Exercise: SSTF disk scheduling algorithm.

UNIT V **18 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: UNIX and Linux Comparison – Process Management – File Management – Device Drivers – Security.

Text Books

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Deitel H.M.	Operating Systems	Pearson Education Publication	2nd Edition

Reference Books

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Achyut S Godbole	Operating Systems	TMH Publications	2002
2	Harvey M. Deitel, Paul J. Deitel, David R. Choffnes	Operating Systems	Pearson Education	2003

Web Resources

1. https://computer.howstuffworks.com/operating-system.htm
2. https://www.techopedia.com/definition/9654/scheduling
3. https://www.tutorialspoint.com/operating_system/os_memory_management.htm
4. https://operatingsystemsam.wordpress.com/processor-management/
5. https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.3.0/com.ibm.zos.v2r3.ieae100/auxover.htm
6. https://www.includehelp.com/operating-systems/file-management-in-operating-system.aspx

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar.

SEMESTER IV

CODE	COURSE TITLE
18CSUCP04/ 18CAUCP04	WEB PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Practical - IV	40	60	-	5	55	3

Preamble

This course provides the knowledge for students to design web pages using simple HTML, CSS and JavaScript.This also enables the students to understand and implement the WEB applications.

Course Outcomes

On the successful of this course, student will be able to

CO Number	CO Statement	Knowledge Level
CO1	Design and develop their own web page	K2
CO2	Design and develop programs using CSS	K2
CO3	Implement the concept of functions in javascript	K3
CO4	Implement the concept of arrays and strings..	K3
CO5	Develop applications using Events and Objects.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	M	M

CO3	S	M	M	S	L
CO4	M	S	S	M	M
CO5	S	S	M	M	S

S- Strong; M-Medium; L-Low

Practical List

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. 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.
4. 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)
5. 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.

6. 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.
7. Write a program to read numeric data and sort them using bubble sort.
8. 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.
9. Write a program to read a string and use indexOf, lastIndexOf and split methods of String object.
10. 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.

Web Resources

1. https://www.w3resource.com/javascript-exercises
2. https://www.udemy.com/complete-web-development-course

Pedagogy

Demonstration, Flipped Learning

SEMESTER IV

CODE	COURSE TITLE
18CAUA404	ENTERPRISE RESOURCE PLANNING

Category	CIA	ESE	L	T	P	Credits
Allied	25	75	70	5	-	5

Preamble

This course focuses on fundamental concepts of manufacturing perspective, modules and benefits of ERP.

Course Outcomes

On the successful completion of the course, students will be able to

COs	CO Statements	Knowledge Level
CO1	Explain the fundamentals and importance of ERP	K2
CO2	Examine the manufacturing perspectives of CAD/CAM in ERP	K3
CO3	Illustrate the modules of ERP	K2
CO4	Describe the benefits of ERP in various business field	K2
CO5	Demonstrate the Lifecycle and implementation of ERP	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	M
CO2	M	S	L	M	L
CO3	M	M	S	L	S
CO4	M	M	M	M	S
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Introduction to ERP: Evolution of ERP -Reasons for the growth of the ERP market-The advantages of ERP- Reason for failure in ERP implementations-ERP packages.

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).

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Alexis Leon	Enterprise Resource Planning	Tata Mcgraw Hill, New Delhi	2006

REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Mary Summer	Enterprise Resource Planning	Pearson Education	2006
2.	Ravi Shankar, S. Jaiswal	Enterprise Resource Planning	Galgolia Publication Pvt. Ltd., New Delhi	1999

Web Resources

1. https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm
2. https://www.slideshare.net/silvygoldy/enterprise-resource-planning-by-alexis-leon-mohit

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

Skill based Subject II: Multi Skill Development Paper

Instructional Hrs.: 45 **Sub. Code: 18CSUS402/ 18CAUS402 / 18ITUS402 / 18CTUS402**

Max. Marks : CIA-40; ESE - 60 **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 Indian Government Services** – Reservation – Banking – 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 Examination,* , Tata McGraw-Hill Publishing Company Limited, New Delhi, 4th edition (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 UpkarPrakashan

WEB RESOURCES

1. https://www.india.gov.in
2. http://www.tn.gov.in
3. https://portal2.passportindia.gov.in

SEMESTER IV

Non Major Elective II: Web Designing (Dream Weaver) Lab

Instructional Hrs. : 30 **Sub. Code : 18CSUNP02**

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

Objective: To design simple web pages using Dream Weaver

1. Create an order list, unordered list, definition list and some nested list. Change the text alignment, text style, text color in the page.
2. Insert an image into a web page and experiment with Dreamweaver's image editing tools. Try using sharpen, cropping & brightness/contrast. Then resize the image and try image re-sampling.
3. 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 & the numeric data in column 2.
4. 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.
5. 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.
6. 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.
7. 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.
8. Design a web site for a product of your choice using frames.

SEMESTER V

CODE	COURSE TITLE
18CSUC510 / 18CAUC510	COMPUTER NETWORKS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	86	4	-	4

Preamble

On successful completion of this subject the student should have knowledge on fundamental concepts of Network, layers, and Network Security.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate different Network models.	K2
CO2	Identify and differentiate the functionalities and devices of each layer in the network model	K1-K2
CO3	Understand the purpose and services of different protocols	K1-K2
CO4	Analyze various routing algorithms.	K2-K3
CO5	Secure data communication using various security measures	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	M
CO2	S	M	S	S	M
CO3	S	M	S	M	S
CO4	L	S	M	S	M
CO5	L	M	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **18 Hrs.**

Introduction: *Uses of Computer Networks* – Network hardware – Network Software – Reference Models – The OSI Reference Model – The TCP/IP Reference Model. **The Physical Layer**: Guided Transmission Media – The Public Switched Telephone Network: Switching.

UNIT II **18 Hrs.**

Data Link Layer: Data Link Layer Design Issues – Error Detection and Correction - Elementary Data Link Protocols. **The Medium Access Control**: The Channel Allocation Problem - Multiple Access Protocols: Carrier Sense Multiple Access Protocols – Collision-Free Protocols – Limited Contention Protocols – Bluetooth: Bluetooth Architecture – Bluetooth Applications.

UNIT III **18 Hrs.**

Data Link Layer: Data Link Layer Design Issues – Error Detection and Correction - Elementary Data Link Protocols. **The Medium Access Control**: The Channel Allocation Problem - Multiple Access Protocols: Carrier Sense Multiple Access Protocols – Collision-Free Protocols – Limited Contention Protocols – Bluetooth: Bluetooth Architecture – Bluetooth Applications.

UNIT IV **18 Hrs.**

The Transport Layer: The Transport Service: Services provided to the Upper Layers – Transport Service Primitives – Berkeley Sockets – Elements of Transport Protocols - **The Application Layer**: *DNS-The Domain name System*.

UNIT V **18 Hrs.**

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 Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Andrew S. Tanenbaum, David J. Wetherall	Computer Networks	Pearson Education, Asia	2013, Fifth Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Behrouz A.Forouzan	Data Communication and networking	McGraw-Hill	2012 and Fifth Edition
2.	William A. Shay	Understanding Data Communication and Networks	Course Technology	2004 and Third Edition

Web Resources

1. https://www.tutorialspoint.com/computer_networks/index.asp
2. https://nptel.ac.in/courses/106/105/106105081/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER V

CODE	COURSE TITLE
18CSUC511/18CAUC511/19ITUC306 /18CTUC511	**SOFTWARE ENGINEERING**

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

This course introduces the basic concepts and methods of software engineering to enable the students to design a new software project of high quality. It seeks to complement with a detailed knowledge of techniques for the analysis, design and testing of complex software intensive systems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recognize basic software engineering methods, practices and their appropriate application	K1
CO2	Understand common life cycle models to plan and deliver an effective Software engineering process	K2
CO3	Describe the concepts from Software engineering, spanning all aspects of activities in Software engineering process	K2
CO4	Identify the implementation issues such as modularity and coding standards	K2
CO5	Compare and study the software testing approaches	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	L	M	M

CO2	S	L	L	M	M
CO3	M	M	L	M	M
CO4	S	S	M	M	M
CO5	M	M	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15 Hrs.

Software and software Engineering: The nature of Software- Software Engineering -The Software Process-Software Engineering Practice-Software Myths- Process models: A Generic process model-Process assessment and improvement-Prescriptive Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes.

UNIT II 15 Hrs.

Understanding Requirements: Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing Use Cases-Building the Requirements, Model-Negotiating Requirements-Validating Requirements. **Requirements Modelling:** Scenarios, Information and Analysis Classes: Data Modeling Concepts-Class-Based Modeling.

UNIT III 15 Hrs.

Design Concepts: The Design Process – Design Concepts - The Design Model. **Architectural Design:** Software Architecture- Define Architecture - Importance of Architecture - Architectural Descriptions-Architectural Decisions Component-Level Design: Define Component -Designing Class Based Components-Designing Traditional Components.

UNIT IV 15 Hrs.

Quality Concepts: Define Quality - Software Quality -**Software Quality Assurance:** Elements of Software Quality Assurance-SQA Tasks, Goals and Metrics- **Software Testing Strategies:** A Strategic Approach to Software Testing- Strategic Issues-Test Strategies for Conventional Software-Test Strategies for Object-Oriented Software- Validation Testing - System Testing - The Art of Debugging.

UNIT V **15 Hrs.**

Testing Conventional Applications: Software Testing Fundamentals-Internal and External Views of Testing-White-Box Testing-Basis Path Testing- Control Structure Testing: Black-Box Testing.**Maintenance and Reengineering:** Software Maintenance – Software Supportability-Reengineering-Business Process Reengineering-Software Reengineering- Reverse Engineering.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Roger S. Pressman	Software Engineering-A Practitioner's Approach	MC-Graw Hill Higher Education	2017 7th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ian Somerville	Software Engineering	Pearson Education	2017, 10th Edition
2.	Richard Fairley	Software Engineering Concepts	McGraw Hill Educations	2017

Web Resources

1. https://www.tutorialspoint.com/software_engineering/
2. http://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf
3. http://www.bcanotes.com/Download/SoftwareEngineering/SOFTWARE%20ENGINEERING.pdf
4. https://www.wiziq.com/tutorials/software-engineering
5. https://www.powershow.com/search/presentations/ppt/roger_s_pressman

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER V

CODE	COURSE TITLE
18CSUC512 / 18CAUC512/18CTUC614	PYTHON PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	71	4	-	4

Preamble

The objective of the course is to learn the basic concepts of Python and use of various data structures tuple, list, dictionary and sets.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply decision making and repetition structures in program design.	K2
CO2	Develop functions to improve readability of programs	K1
CO3	Design the programs using Python data types such as tuples, strings, lists and dictionaries	K4
CO4	Adopt file and exception handling mechanisms	K3
CO5	Ability to build python program to solve real world problems	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	M	S	S	M	M
CO3	M	S	S	S	S
CO4	S	S	M	S	S
CO5	M	M	M	S	S

S - Strong; M - Medium; L – Low

Syllabus

UNIT I **15 Hrs.**

Introduction: Introduction to Python, Python overview, Getting started with python, Comments, Identifiers, Reserved keywords, Variables, Standard Data Types, Operators, Statements and Expressions, String Operations, Boolean Expressions. Control Statements- for, while, if elif else, while.

UNIT II **15 Hrs.**

Functions: Built-in Functions, Composition of Functions, User Defined Functions, Parameters and Arguments, Function Calls, Python Recursive Function, The Anonymous Functions, Writing Python Scripting.

UNIT III **15 Hrs.**

Strings and Lists: Strings - Compound Data type, len Function, String Slices, Strings are immutable, Escape Characters, String Formatting Operator, String Formatting Functions. Lists - Values and Accessing Elements, Traversing a List, Deleting Elements from List, Built-in List Operators, Built –in List Methods.

UNIT IV **15 Hrs.**

Tuples and Dictionaries: Tuples -Creating Tuples, Accessing Values in Tuples, Tuple Assignment, Tuples as Return Values, Basic Tuples Operations, Built-in Tuple Functions. Dictionaries -Creating a Dictionary, Accessing Values in a Dictionary, Updating Dictionary, Deleting Elements from Dictionary, properties of Dictionary Keys.

UNIT V **15 Hrs.**

Files and Exceptions: Text Files - Different modes of opening the file, closing a file, writing to a file, Reading from a File, Directories - Exceptions - Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-Defined Exceptions.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	E.Balagurusamy	Introduction to Computing and Problem Solving Using Python	McGraw Hill Education	2016, 1st Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	R. NageswaraRao	Core Python Programming	Dreamtech Press	2016, 2nd Edition
2.	Timothy A. Budd	Exploring Python	Mc-Graw Hill Education (India) Private Ltd.	2015, 1st Edition (Reviewed)
3	Allen B. Downey	Think Python: How to Think like a Computer Scientist, updated for Python 3	O'Reilly Publishers	2016, 2nd Edition

Web Resources

1. https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English
2. http://nptel.ac.in/courses/117106113/34
3. https://swayam.gov.in/nd1_noc20_cs80/preview

Pedagogy

Lecture, PPT, Quiz, Assignment, Seminar and Demonstration

SEMESTER V

CODE	COURSE TITLE
18CSUC512 / 18CAUC512/18CTUC614	PYTHON PROGRAMMINGLAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60	-	5	55	3

Preamble

The main objective is to exercise control structures, string, list, tuple, dictionary, tuple, sets, class and objects using Python.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate branching and looping concepts	K2
CO2	Develop code using Lists and Tuples	K4
CO3	Construct programs using Strings and Functions	K3
CO4	Build Code for Problems using Dictionary and Sets	K3
CO5	Make use of Class in Python Programs	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	**S**
CO2	M	S	M	S	**S**
CO3	S	M	M	S	**S**
CO4	S	S	M	S	**S**
CO5	S	S	M	S	**M**

S- Strong; M-Medium; L-Low

Practical List

1. Write a program to print numbers from 1 to n using for loop and while loop. (Input consists of an integer n. The numbers in the output are separated by a single space. There is a trailing space at the end.)

Input	5
Output	1 2 3 4 5

2. Write a program to generate the given pattern. (Input consists of a single integer, n.)

CSK CCSSKK CCCSSSKKK CCCCSSSSKKKK	**Input**	4
	Output	CSK CCSSKK CCCSSSKKK CCCCSSSSKKKK

3. Check whether a given number is a Kaprekar number.

   Kaprekar'snumber : Consider an n-digit number k. Square it and add the right n digits to the left n or n-1 digits. If the resultant sum is k, then k is called a Kaprekar number. (Input consists of a single integer)

Input	9	297	101
Process	$9^2 = 81$ 8+1=9	$297^2 = 88209$ 88+209 = 297	$101^2 = 10201$ 10 + 201 != 101
Output	Kaprekar Number	Kaprekar Number	Not a Kaprekar Number

4. Write a program to generate the first n terms in the series --- 20,19,17,..,10,5

   (Note: Input consists of a single integer which corresponds to n. Output consists of the terms in the series separated by a blank space.)

Input	6	4
Output	20 19 17 14 10 5	20 19 17 14

5. Write a program to remove special characters and numbers in the input string and returns a string made of the first 2 and the last 2 characters of the given string.

   Conditions:
   If the resultant string length is less than 2, return -1. If the string length is equal to 2, consider the 2 characters to be the first as well as the last two characters.

Input	3 P^&y2!#t50.h**on1 3	H1e2l3l4o5w6o7r8l9d	3 P^&2 3 4
Output	Python Pyon	Helloworld Held	-1

6. Write a program to find whether the 2 given strings are anagrams or not. Anagrams are words or phrases made by mixing up the letters of other words or phrases (Note: Input consists of 2 string. Assume that all characters in the string are lowercase letters or spaces and the maximum length of the string is 100.)

Input1	Anitha	the eyes
Input2	Amphisoft	they see
Output	**not anagrams**	**anagrams**

7. Given a list of numbers, write a python function which returns true if one of the first 5 elements in the list is 11. Otherwise it should return false. (Note: The length of the list can be less than 5 also.)

Input		**Output**
List Size	**Values**	
6	3 11 8 9 4 11	True
3	9 4 10	False

8. Write a program to sort each list of student's marks and sort the whole mark list in ascending order. Use tuple() to store each student's marks.

   Input format: The first line of input is the number of students (n). Second line consist number of subjects (m). Next line will be n*m subject marks

Output format: List of the subject marks in sorted order and sorted order of individual student marks. i.e List in sorted order of the marks of n students.)

Input (Assume each number in separate line)	**Output**
3 5 2 1 5 3 1 6 1 3 2 2 1 7 8 5 3	[(1, 1, 2, 3, 5), (1, 2, 2, 3, 6), (1, 3, 5, 7, 8)]
3 2 4 6 3 2 7 4	[(2, 3), (4, 6), (4, 7)]

9. Write a python function to create a dictionary from the input and return a new dictionary from the given dictionary based on some condition.

(Note: Input : The first line of input 'n' corresponds to the number of lists. The list consists of an item and price. The last line of input corresponds the value of 'M' . Output : Contains a dictionary of items that contain items of price greater than 'M'.)

<table>
<tr><th></th><th>n</th><th>M</th><th>Item</th><th>Price</th><th>Output</th></tr>
<tr><td rowspan="5">Input 1</td><td rowspan="5">4</td><td rowspan="5">200</td><td>ACME</td><td>45.23</td><td rowspan="5">{'IBM': 205.55,
'AAPL': 612.78}</td></tr>
<tr><td>AAPL</td><td>612.78</td></tr>
<tr><td>IBM</td><td>205.55</td></tr>
<tr><td>HPQ</td><td>37.20</td></tr>
<tr><td>FB</td><td>10.75</td></tr>
<tr><td rowspan="5">Input 2</td><td rowspan="5">4</td><td rowspan="5">1000</td><td>AAPL</td><td>612.78</td><td rowspan="5">{ }</td></tr>
<tr><td>IBM</td><td>205.55</td></tr>
<tr><td>HPQ</td><td>37.20</td></tr>
<tr><td>FB</td><td>10.75</td></tr>
</table>

10. Write a program to find the Symmetric Difference between two sets.

The symmetric difference of two sets A and B is the set of elements that are in either of the sets A or B but not in both.

(Input: First line contains the elements of set1(integers). Second-line contains the elements of set2 (integers).
Output : Print the set consisting of Symmetric_Difference between set1 and set2. If both set elements are equal, print 'invalid set'.)

Input	**Set 1**	**Set 2**	**Set 1**	**Set 2**
	1,2,3,4,5,6	2,3,5,7,8,9	1,2,3	1,2,3
Output	{1, 4, 6, 7, 8, 9}		Invalid set	

11. Mobile Apps: Write a python program to collect the required attributes from the user about apps installed in their mobile. Use Class/Object and print the data in neat format.

Create a class **Apps** with the following public attributes:

Data_Type	**Attribute_name**
int	appID
str	appName
str	lastAccessTime
int	powerConsumption
float	dataConsumption
float	appSize

[Note: **Strictly adhere to the object-oriented programming concepts**. Create an **init__()** method to initialize the values

Output format:
print("%-15s %-15s %-15s %-15s %-15s %-15s"%("AppID","AppName","LastAccessTime","PowerConsumption**(%)**","DataConsumption","AppSize"))]

	No. of Apps	App id	App Name	Last Access Time(24hrs) (HH:MM:SS)	Power Consumption	Data Consumption (MB)	App Size (MB)
Input1	**2**	**1**	**ArogyaSethu**	**12:10:10**	**14**	**0.23**	**20.85**
		2	**DigiLocker**	**12:12:12**	**12**	**0.14**	**32.45**

Input2	**0**	**-**	-	**-**	**-**	**-**	**-**

Output 1:

AppID	AppName	LastAccessTime	PowerConsumption**(%)**	DataConsumption	AppSize
1	ArogyaSethu	12:10:10	14	0.23	20.85
2	DigiLocker	12:12:12	12	0.14	32.45

Output 2:

No App installed

12. Write a python function to find out whether a number is divisible by the sum of its digits. If so return True, else return False. If the number is less than or equal to 0, the function returns "Invalid Input".

Input	42	66
Output	True	False

Web Resources

1. https://www.w3resource.com/python-exercises/
2. https://pynative.com/python-basic-exercise-for-beginners/

Pedagogy

Demonstration, Flipped Learning

SEMESTER V

CODE	COURSE TITLE
18CAUE511	COMPUTER GRAPHICS AND MULTIMEDIA

Category	CIA	ESE	L	T	P	Credit
Elective I	25	75	86	4	-	4

Preamble

Computer Graphics is the combined use of text, graphics, sound, animation and video. A primary objective of this to develop multimedia programs, demonstrate how still images, sound, and video can be digitized on the computer.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept on Output Primitives and kind of Attributes.	K2
CO2	Gain a more profound understanding of measurement and of2 Dimensional geometry.	K2
CO3	Learn the Types of text, Coloring the text and File formats.	K3
CO4	Evaluate the Nature sound waves and audio types.	K3
CO5	Demonstrate the use of animation, video control, and scanned images.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	S	S	M	S
CO3	S	M	S	M	S
CO4	S	S	S	M	M
CO5	M	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **13 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 **15 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 **15 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 **16 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 **16 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.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Donald Hearn, Pauline Baker M.	Computer Graphics	PHI, 2008	2008, Second Edition,.
2.	Ranjan Parekh	Principles of Multimedia	TataMcGraw Hill	2011.

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Amarendra N Sinha Arun D Udai	Computer Graphics	TMH	2009
2.	Tay Vaughan	Multimedia: Making It Work	TMH, 2007	2007, 7th Edition.

Web Resources

1. https://www.edx.org/learn/computer-graphics
2. https://www.w3.org/standards/webdesign/graphics

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER V

CODE	COURSE TITLE
18CAUE531	E-COMMERCE

Category	CIA	ESE	L	T	P	Credit
Elective I	25	75	86	4	-	5

Preamble

The objective of the course is to learn the concepts and technologies of E-Commerce.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of E-Commerce and world wide web	K1
CO2	Define the E-strategies, Tactics, Managerial and customer related issues.	K2
CO3	Explore the Website Evaluation, Usability Testing and hosting the website.	K4
CO4	Evaluate electronic payment systems and apply E-Security protection in E-commerce.	K3
CO5	Discuss about ethical and legal issues in E-commerce	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	M	S	S	M	M
CO3	M	S	S	S	S
CO4	S	S	M	S	S
CO5	M	M	M	S	S

S- Strong; M-Medium; L–Low

Syllabus

UNIT I **15 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 **15 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 **15 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 **15 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 **15 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*.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Elias M.Award	Electronic Commerce-From Vision to fulfillment	Prentice Hall of India, New Delhi	2002,3rd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jeffery F. Rayport, Bernard J. Jaworski	E- Commerce	TMH, New Delhi	2002
2.	Joshep P.T	E- Commerce – A Managerial Perspective	PHI, New Delhi	2003

Web Resources

1. https:// 164.100.133.129:81/econtent/Uploads/Electronic_Commerce.pdf
2. https://www. tutorialspoint.com/e_commerce/index.html

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER V

CODE	COURSE TITLE
18CSUE521/18CAUE521 /18ITUE531/18CTUE521	PREDICTIVE ANALYTICS

Category	CIA	ESE	L	T	P	Credit
Elective I	25	90	86	4	-	5

Preamble

To understand and impart the knowledge on Big data analytics. To enable the students to know the types of predictive models in Big data analytics.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know about the fundamentals concepts of big data	K1
CO2	Gain knowledge about data mining and predictive analytics.	K1
CO3	Analyze various types of Predictive Models and develop a Predictive Model	K3
CO4	Analyze various types of social networks and mapping of social networks	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	M	S	L
CO3	S	M	L	M	S
CO4	S	M	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

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 Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1	Steven Finlay	Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods	Macmillan Publishers Limited	2014, First Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Chuck Lam	Hadoop In Action	Manning Publication, USA	2012,First Edition
2	Alan Gates	Programming Pi	O'Reilly Media, USA	2011,First Edition
3	Jimmy Lin and Chris Dyer	Data-Intensive Text Processing with Map Reduce	Morgan and Claypool, USA	2010, First Edition

Web Resources

1. https://slideplayer.com/slide/6206816
2. https://www.slideshare.net/GhulamImaduddin1/big-data-analytics-58553692
3. https://www.researchgate.net/publication/328783489_Big_Data_and_Big_Data_Analytics_Concepts_Types_and_Technologies/link/5be2b85da6fdcc3a8dc40690/download

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER V

CODE	COURSE TITLE
18CSUSP03 / 18CAUSP03/ 18ITUSP03/ 18CTUSP03	DTP DESIGN TOOLS(PAGEMAKER, PHOTOSHOP & CORELDRAW) LAB

Category	CIA	ESE	L	T	P	Credit
SKILL BASED SUBJECT- III	40	60	-	5	40	3

Preamble

Objective : To enable students to self-publish a wide variety of content, from menus to magazines to books, without the expense of commercial printing.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Use various tools to design and produce publications using Pagemaker that requires a combination of text and graphics.	K2
CO2	To import text and artwork from other computer application packages	K2
CO3	Creates pixel based raster images usingPhotoshop tools with multiple image-editing functions fall under the categories ofdrawing; painting; measuring and navigation; selection; typing; and retouching	K3
CO4	Apply effects or adjust images	K2
CO5	Create big banners and any large entities using vector-based software Coreldraw	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	M
CO2	S	S	L	M	S
CO3	S	M	L	M	S
CO4	S	S	L	M	M
CO5	S	M	L	M	M

S- Strong; M-Medium; L-Low

PAGEMAKER

1. Prepare a student resume carrying the following tags:

- About me
- Contact
- Education
- Skills
- Awards
- Relevant Experience

2. Create a greeting card for New Year

3. Create a report for news paper of size 13.5" x 21.5" (Broadsheet) containing

- Newspaper Title, Picture to tell the report/story
- Number of columns 4(Leave space between columns)

PHOTOSHOP

1 Create realistic Clouds in Coffee by combining multiple stock photos into unreal scenes using adjustment layers, masking, and brush.

2. Using the following design a good looking clean and functional Web layout for a company.

- Create Header which contains Logo type, Navigation and Welcome lines
- Apply gradient to the background
- Add slider rotation controls
- Create content driver
- Add main content
- Create footer

3. Animate a still photo of water fall

CORELDRAW

1. Design a web banner to be displayed along the top of a web page or the whole website which announces special offers, new products, or other important content. Use Leaderboard Ad size which is 728px X 90px.

2. Create a custom flyer for the advertisement purpose which is of single sided that will be posted

on a wall or bulletin board

3. Make a floral pattern for table cloth by using the following tools:

- Freehand tool
- Shape Tool
- Outline Tool
- Transparency Tool
- Fountain Fill Dialog Box
- Interactive Mesh Fill Tool

4. Import a raster logo into CorelDRAW and convert it to vector format

Web Resources

1. https://www.photoshoptutorials.ws/photoshop-tutorials/
2. https://resumegenius.com/resume-samples
3. http://ncsmindia.com/wp-content/uploads/2012/04/DTP4.pdf
4. https://www.coreldraw.com/en/learn/how-to/?topNav=en
5. https://www.youtube.com/watch?v=kw07wyP3qm4

Pedagogy

Hands on Training,PPT

SEMESTER VI

CODE	COURSE TITLE
18CSUC613/18CAUC613/ 18CTUC613/ 18ITUC613/	**OPEN SOURCE TECHNOLOGIES**

Category	CIA	ESE	L	T	P	Credit
Core	25	75	71	4	-	5

Preamble

This course introduces the principles of open source methodology, different types of licenses and some open source software. PHP and MySQL, a popular and powerful software for web development is presented in this course to enable the students to work with open source software.

Prerequisite

- HTML, CSS and C++/JAVA programming Language
- Database Management System

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge on open source, principles and its methodology.	K2
CO2	Develop the knowledge of different software licenses and their usage.	K2
CO3	Practice the concepts of control structures and functions in PHP applications	K2-K3
CO4	Use string handling and array operations in PHP applications	K2-K3
CO5	Apply the connectivity between PHP and MySQL database and develop web pages using PHP, HTML and MySQL	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	L	M	M
CO2	M	L		L	M
CO3	M	M	M	M	M

CO4	M	M	M	M	M
CO5	M	M	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Introduction to Open Source: Definition – Principles-Open Standards Requirements for Software – Where OSS has succeeded – Open Source Successes – Free Software and its examples – Free Software License Provider – Free software Vs. Open Source Software – Public Domain – History – Why Free Software is better than Open Source – Proprietary Vs. Open Source Software – Reason for using OSS – Reasons for not using OSS. **Principles and Open Source Methodology**: History – Open Source Initiatives – Open Standards Principles Methodologies – Philosophy – Software Freedom.

UNIT II **15 Hrs.**

Open Source Software Development – Licenses – Copyright –Copyleft – Patent – Zero Marginal Cost – Income-generation Opportunities – Internationalization. **Case Studies**: Apache – Berkeley Software Distribution – Linux – Mozilla Firebox – Wikipedia – Joomla! – GNU Compiler Collection – Open Office.

UNIT III **15 Hrs.**

Introducing PHP: Why PHP and MySQL?- Server-Side Scripting Overview- Learning PHP Syntax and Variables.Learning PHP Control Structures and Functions

UNIT IV **15 Hrs.**

Passing Information with PHP-Learning PHP String Handling - Learning Arrays - PHP Number Handling

UNIT V **15 Hrs.**

Introducing Databases and MySQL - Learning Structured Query Language (SQL) - Integrating PHP and MySQL- Performing Database Queries - Integrating Web Forms and Databases

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bhavyesh Gandhi KailashVadera	Open Source Technology	Univ.Science Press, An Imprint of Lakshmi Publications Pvt Ltd.,	First Edition, Reprint 2013

2.	Steve Suehring, Tim Converse, Joyce Park	PHP6 and MySQL Bible	Wiley-India Private Ltd.,	2016

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	M.N.Rao	Fundamentals of Open Source Software	PHI Learning Private Ltd.,	2015
2.	Mike McGrath	PHP and MySQL	McGraw Hill Education Private Ltd., India	2017, 1st Edition
3.	Luke Welling, Laura Thomson	PHP and MySQL Web Development	Pearson Education Inc.	2017, 5th Edition
4.	Marty Matthews	PHP and MySQL Web Development: A Beginner's Guide	McGraw Hill Education Private Ltd., India	2015, 1st Edition

Web Resources

1. https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English
2. https://www.formget.com/form-validation-using-php/
3. https://tutorialsclass.com/exercises/php/php-all-exercises-assignments/
4. https://www.w3resource.com/php-exercises/

Pedagogy:

Lectures, Presentations, Demonstrations, Guest Lectures

SEMESTER VI

CODE	COURSE TITLE
18CSUC512 / 18CAUC512 / 18CTUC614	ANDROID PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	71	4	-	4

Preamble

The objective of the course is to enable the students to learn the appropriate tools for Android development and gain experiences in developing applications on mobile platform.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Demonstrate the Android Platform, Architecture and Features	K1 – K2
CO2.	Design User Interface and Develop Activity for Android Applications	K1 – K2
CO3.	Use Indent, Broadcast Receivers and Internet Services in Android Applications	K3
CO4.	Apply Multimedia, Camera and Location Based Services in Android Applications	K3
CO5.	Develop and Implement Database Applications using JSON	K3 – K5
CO6.	Design and Develop any Mobile Application suitable for a real time use	K3 – K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	L	L			L
CO2.	L	S	M	S	S
CO3.	L	L			M
CO4.	L	L			M
CO5.	M	S		S	M
CO6.	M	S	M	S	S

S- Strong; M-Medium; L-Low

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 Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Prasanna Kumar Dixit	Professional Android 4 Application Development	Android, Vikas Publishing House Pvt Ltd	2014 1st Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Reto Meier	Professional Android 4 Application Development	Wiley India Pvt Ltd	2012, 4th Edition

Web Resources

- www.spoken-tutorial.org
- www.nptel.ac.in
- https://www.slideshare.net/

Pedagogy

Lecture, PPT, Quiz, Demonstration, Assignment, Group Discussion, Seminar

SEMESTER VI

CODE	COURSE TITLE
18CSUCP05/18CAUCP05/18CTUCP06	ANDROID PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60	-	5	55	3

Preamble

The main objective of Android Programming Lab is to practice and experience the process of mobile application development.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the functions of UI components	K2
CO2	Create User Interfaces for any mobile application	K3-K5
CO3	Construct Mobile apps incorporating message sending, camera activation, audio playing and google maps features	K3-K5
CO4	Build Mobile apps with database using SQLite	K3-K5
CO5	Create simple applications using JSON	K3-K5

Mapping with Programme Outcomes

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	L	L		L	S
CO2	L	M	M	M	S
CO3	L	M	S	M	S
CO4	L	S	S	S	S
CO5	L	S	S	S	S

S - Strong; M - Medium; L – Low

Practical List

1. Create an Android Application to demonstrate any five UI components functionality using Material design principles.
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 RecyclerView 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 PHP and MySQL.

Web Resources

1. https://acodez.in/android-development-eclipse/
2. https://www.tutorialspoint.com/android/android_eclipse.htm
3. https://codelabs.developers.google.com/android-training/
4. https://material.io/develop/android/docs/getting-started/
5. https://codelabs.developers.google.com/codelabs/mdc-101-java/#0

Pedagogy

Demonstration, Flipped Learning, Creativity Test, Design contests

SEMESTER VI

CODE	COURSE TITLE
18CSUE612 / 18CAUC613 / 18CTUE632	WIRELESS APPLICATION PROTOCOL

Category	CIA	ESE	L	T	P	Credit
Elective II	25	75	70	5	-	5

Preamble

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

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the basic concepts of wireless application protocol.	K1-K2
CO2.	Explain the architecture, functioning, and protocols, of various WAP.	K2-K4
CO3.	Enhance the knowledge of gateway and hosting for WAP pages.	K2-K3
CO4.	Demonstrate the concept of wireless markup language and its applications.	K2-K3
CO5.	Demonstrate an ability to evaluate security issues associated with wireless application protocol.	K1-K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1.	S	S	L	M	M
CO2.	S	S	M	M	S
CO3.	M	M	L	M	S
CO4.	S	S	L	M	M
CO5.	S	M	L	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 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 **20 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 **20 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 **20 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.

Text Books

S.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Er.V.K.Jain	Programming WAP, WAP Servlets with WML, WML Script, Smart Card and 3G	Published by Dream tech press	First edition

Reference Books

S.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Steve Mann, Scott Sbihli	The Wireless Application Protocal	Published by Wiley	First edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER VI

CODE	COURSE TITLE
18CAUE612	SOFTWARE PROJECT MANAGEMENT

Category	CIA	ESE	L	T	P	Credit
Elective II	25	75	80	10	-	5

Preamble

To provide a sound understanding of the software project management concepts. Also, to help the students understand the challenges and issues in software projects from project managers perspectives. To learn as how to incorporate leadership and management qualities in software product development.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify suitable software process model for software projects.	K2
CO2	Differentiate different software product development techniques.	K2
CO3	Apply appropriate software cost estimation technique for a given project.	K3
CO4	Apply software project management principles for a software project.	K3
CO5	Develop software metrics for measuring and managing software processes.	K4
CO6	To assess the software product for quality standards.	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	-
CO2	M	M	-	S	S
CO3	M	S	S	M	M
CO4	M	S	M	S	S
CO5	S	L	L	S	M
CO6	S	M	L	S	M

S- Strong; M-Medium; L-Low

Syllabus

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 Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bob Hughes and Mike Cotterell	Software Project Management	Tata McGraw Hill Publication Company Limited, New Delhi	Fourth Edition and 2006

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	MDerrelInce, Sharp H and Woodman M	Introduction to Software Project Management and Quality Assurance	TataMcGraw Hill	1995
2.	Kelkar	Software Project Management – A concise study	PHI, New Delhi	2003

Web Resources

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. https://nptel.ac.in/courses/106/105/106105218/
3. https://www.slideshare.net/RajendraAkerkar/software-project-management-9146521
4. https://www.docsity.com/en/lecture-notes/computer-science/software-project-management/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER VI

CODE	COURSE TITLE
18CAUE632 / 18CTUC622/ 18ITUC612	INTERNET OF THINGS AND ITS APPLICATIONS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	71	4	-	5

Preamble

To enable the students to learn about the fundamentals, building blocks, applications of IoT, security and vulnerabilities of internet of things.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	To understand the physical, logical design of IoT and to identify various IoT levels	K1
CO2.	To describe conceptual framework, architectural views ,technology behind IoT and design principles for connected devices	K2
CO3.	To understand the Physical Servers and different types of applications in various domains	K1
CO4.	To demonstrate the design methodology and building blocks of IoT devices	K2
CO5.	To understand IoT privacy, security, vulnerabilities solutions and business models with applications	K1

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5
CO1.	**S**	M	S	S	S
CO2.	M	M	S	S	S

CO3.	M	M	L	S	S
CO4.	**S**	L	L	S	S
CO5.	**S**	L	L	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Introduction to Internet of Things: Introduction – Physical Design of IoT - Logical Design of IoT - IoT Enabling Technologies – IoT levels & Deployment Templates

UNIT II **15 Hrs.**

IOT: Conceptual framework – Architectural view – Technology behind IOT – Sources of IOT – M2M Communication – Examples of IOT. **Design Principles for Connected Devices**:

UNIT III **15 Hrs.**

Domain Specific IoTs: Introduction – Home Automation – Cities – Environments – Retail – Logistics - Agriculture –Industry – Health & Lifestyle - **IoT Physical Servers and Cloud Offerings:** Introduction to cloud storage models & communication APIs **–** WAMP – AutoBahn for IoT – Xively Cloud for IoT

UNIT IV **15 Hrs.**

IoT Platforms Design Methodology: Introduction – IoT Design Methodoloy – Case Study on IoT System for Weather Monitoring - **IoT Physical Devices & Endpoints**: Building blocks of an IoT Device – Exemplary Device: Raspberry Pi – About the Board – Raspberry Pi Interfaces - Other IoT Devices

UNIT V **15 Hrs.**

IoT Privacy, Security and Vulnerabilities Solutions: Introduction – Vulnerabilities, Security Requirements and Threat Analysis – Use Cases and Misuse Cases - IoT Security Tomography and Layered Attacker Model – **Business Models and Processes Using IoT**: Introduction – Business Models and Business Model Innovation. **IoT Case Studies**: IoT Applications for Smart Homes, Cities, Environment–Monitoring and Agriculture.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	ArshdeepBahga, Vijay Madisetti	Internet of Things: A Hands-On Approach **(Unit I, III, IV)**	Universities Press (India) Private Limited	2018, Reprint
2.	Raj Kamal	Internet of Things: Architecture and Design Principles **(Unit II & V)**	McGraw - Hill Education (India) Private Limited Chennai	2017, 1st Edition

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srinivasa K.G, Siddesh G.M, Hanumantha Raju R	Internet of Things	Cengage Learning India Pvt. Limited	2017, 1st Edition

Web Resources

https://iot-analytics.com/10-internet-of-things-applications
https://www.tutorialspoint.com/internet_of_things/internet_of_things_technology_and_protocols.htm
https://www.techaheadcorp.com/blog/top-6-programming-languages-for-iot-projects/
https://www.avsystem.com/blog/iot-technology/

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER VI

CODE	COURSE TITLE
18CSUSP04/ 18CAUSP04/ 18CTUSP04/ 18ITUSP04	Skill Based Subject IV - PHP and MySQL Lab

Category	CIA	ESE	L	T	P	Credit
SBS IV	**40**	**60**	**-**	**5**	**40**	**3**

Preamble

This course provides exercises to implement features of PHP and MySQL programming. The exercises includes control structures, string, array, functions and web page designing using PHP, HTML and MySQL.

Prerequisite

•C++/JAVA Programming
•PHP / MYSQL
•HTML

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Implement control structures	K3
CO2	Apply the string functions and array operations	K3
CO3	Implement the concepts of user defined functions	K3
CO4	Demonstrate the connectivity with MySQL database	K4
CO5	Develop web pages using PHP, HTML and MySQL	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	M	S	S	M	S
CO3	S	M	M	M	M
CO4	M	S	S	M	S
CO5	M	S	M	S	M

S- Strong; M-Medium; L-Low

Practical List

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a script to calculate Electricity bill in PHP using if-else conditions with the following constraints:
    - For first 50 units – Rs. 3.50/unit
    - For next 100 units – Rs. 4.00/unit
    - For next 100 units – Rs. 5.20/unit
    - For units above 250 – Rs. 6.50/unit
3. Write a simple calculator program in PHP using switch case with addition, subtraction, multiplication and division operations.
4. Write a PHP script to extract the user name from the email ID.
5. Write a PHP script to : -

    a) transform a string to all uppercase letters.

    b) transform a string to all lowercase letters.

    c) make a string's first character uppercase.

    d) make a string's first character of all the words to uppercase.
6. Write a PHP script to calculate and display average temperature, five lowest and highest temperatures.

    Recorded temperatures: 78, 60, 62, 68, 71, 68, 73, 85, 66, 64, 76, 63, 75, 76, 73, 68, 62, 73, 72, 65, 74, 62, 62, 65, 64, 68, 73, 75, 79, 73
7. Write a function to check whether a number is prime or not.
8. Write a PHP script to pass information between web pages using GET and POST methods.
9. Create a simple HTML form and accept student information using different controls and store it in MySQL database.
10. Using PHP and MySQL, develop a Simple Library Management System. Librarian has a provision to add book details like ISBN number, book title, author name, edition and publication details through the web page. In addition to this, librarian or any user has a provision to search for the available books in the library by the book name. If book details are present in the database, the search details are displayed on the web page.

Web Resources

1. https://www.formget.com/form-validation-using-php/
2. https://tutorialsclass.com/exercises/php/php-all-exercises-assignments/
3. https://www.w3resource.com/php-exercises/
4. https://krazytech.com/programs/simple-library-management-system-php-mysql

Pedagogy

Demonstration, Flipped Learning

SELF LEARNING PAPER

1. INTERNET CONCEPTS

Sub. Code: 16CAUSL02

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. R PROGRAMMING

Max. Marks: 100 **Sub.Code: 18CSUSL25**

Credits: 5

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

UNIT I

Overview of R and RStudio - Installing R and RStudio on Linux - Installing R and RStudio on Windows - Introduction to basics of R - Introduction to Data Frames in R

UNIT II

Introduction to RStudio - Introduction to R Script - **Working directories in RStudio** - **Indexing and Slicing Data Frames** - Creating Matrices using Data Frames

UNIT III

Operations on Matrices and Data Frames - ***Merging and Importing Data*** - **Data types and Factors** - ***Lists and its Operations*** - **Plotting Histograms and Pie Chart**

UNIT IV

Plotting Bar Charts and Scatter Plot - Introduction to ggplot2 - Aesthetic Mapping in ggplot2 - Data Manipulation using dplyr Package - More Functions in dplyr Package -

UNIT V

Pipe Operator - **Conditional Statements** - ***Functions in R***

Material: Video Tutorials of Spoken Tutorial, IIT Bombay

ADVANCED LEARNERS COURSE

1. Technical Skills in IT

Max.Marks: 100 **Sub code: 18CSUAL01**

Credits: 5

Digital Fundamentals: Number System – Logic Circuits - Flip Flops. **Data structures:** Problem Solving Techniques – Stack – Queue – List – Searching and Sorting Techniques.

Operating System: Dead Lock – Storage Management – Processor Scheduling - Memory Management. **RDBMS:** Database Concepts - Normal Forms – SQL.

Networks: OSI Layers – TCP/IP Layers – Network Security. Software Engineering: Software Process Model – Prototyping Model – Analysis Concepts and Principles – Design Concepts and Principles – Software Testing Fundamentals.

Programming languages (C, C++, Java, Python): Syntax – Data Types – Operators - Arrays – Functions – Pointers – File Management – OOPS Concept – AWT Concepts – Exception Handling – Debugging.

Emerging Trends:Big Data: Data Mining and Predictive Analysis – Organization – Types of Data – Predictive Models – Predictive Analytics Process. **IoT**: Framework – Applications – Design Methodology – Security. **Cloud:** Architecture – Services – Applications.

ADVANCED LEARNERS COURSE

2. SWAYAM COURSES

Max.Marks: 100 **Sub code : 18CSUAL02**

Credits: 5

The SWAYAM Coordinator/facilitator of each department can select any one SWAYAM MOOC by consensus and disseminate information about selected courses to the students. The coordinator must facilitate registration of students and guide the students throughout the course and to facilitate the conduct of examination.