CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (III CYCLE) WITH "A" GRADE BY NAAC

ISO 9001:2015 Certified

TIRUCHIRAPPALLI – 18

DEPARTMENT OF COMPUTER APPLICATIONS

Bachelor of Computer Applications

2022-2023 onwards

SYLLABUS

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF COMPUTER APPLICATIONS

<u>VISION</u>

❖ To produce globally competent computer professionals by providing high quality education and also focus on developing the skills of technical competency.

❖ To make an incorporated framework that meets the higher instructive necessities of the community.

❖ To prepare the students for technical training with revolutionary vision so they can create employment opportunities for themselves as well as for others.

<u>MISSION</u>

❖ To produce a quality learning environment that helps students to enhance problem solving skills and practical knowledge.

❖ To provide technical education to the students through well-equipped labs.

❖ Giving personal attention to slow learners consequently, allowing them to cope up with other wards.

❖ To impart the professional and communication skills training to the students to get better placement.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	**LEARNING ENVIRONMENT** To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	**ACADEMIC EXCELLENCE** To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	**EMPLOYABILITY** To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	**PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY** To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	**GREEN SUSTAINABILITY** To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES for B.Sc Computer Science,

B.Sc Computer Science with Cognitive Systems , BCA and

B.Sc Information Technology PROGRAMME

PO NO.	On completion of B. Sc Computer Science / B. Sc Computer Science with Cognitive Systems / BCA/ B. Sc Information Technology Programme, the students will be able to
PO 1	**ACADEMIC SKILLS & SOCIAL RESPONSIBILITY** Apply Computing, Mathematical and Scientific Knowledge in Various disciplines by understanding the concerns of the society.
PO 2	**CRITICAL THINKING AND INNOVATIVE PROGRESS** Design the software applications with varying intricacies using programming languages for innovative learning in techno world to meet the changing demands.
PO 3	**PERSONALITY DEVELOPMENT** Perceive Leadership skills to accomplish a common goal with effective communication and understanding of professional, ethical, and social responsibilities.
PO 4	**LIFELONG LEARNING** Identify resources for professional development and apply the skills and tools necessary for computing practice to gain real life experiences.
PO 5	**CREATIVITY AND HOLISTIC APPROACH** Create a scientific temperament and novelties of ideas to support research and development in Computer Science to uphold scientific integrity and objectivity.

PROGRAMME SPECIFIC OUTCOMES FOR BCA

PSO NO.	The students of Bachelor of Computer Applications will be able to	POs Addressed
PSO 1	Understand the concepts of logical and critical thinking with adequate practical skills.	PO1 PO2 PO4 PO5
PSO 2	Adopt necessary technical, scientific, managerial and financial knowledge to be employable or purse higher education.	PO1 PO2 PO4
PSO 3	Apply neoteric technology in various domains and evaluate the method of implementing it.	PO1 PO2 PO4
PSO 4	Design and create innovative ideas that meet the requirements of an entrepreneur and software industry.	PO1 PO2 PO4 PO5
PSO 5	Explore the ethical values, sustainability and productivity.	PO3 PO4 PO5

Semester	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam Hrs.	Exam Marks Int	Exam Marks Ext	Total
I	I	Language Course - I (LC)	Ikkala Ilakiyam – I	22ULT1	6	3	3	25	75	100
			Hindi Literature & Grammar – I	22ULH1						
			History of Popular Tales, Literature and Sanskrit Story	22ULS1						
			Basic French – I	22ULF1						
	II	English Language Course - I (ELC)	Functional English for Effective Communication– I	22UE1	6	3	3	25	75	100
	III	Core Course – I (CC)	Programming in C	22UCA1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	C Programming (P)	22UCA1CC1P	3	3	3	40	60	100
		First Allied Course - I (AC)	Essential Mathematics	22UCA1AC1	4	3	3	25	75	100
		First Allied Course - II (AC)	Numerical Analysis and Statistics	22UCA1AC2	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course -I (AECC)	UGC Jeevan Kaushal-Universal Human Values	22UGVE	2	2	-	100	-	100
		Total			**30**	**22**				**700**
II	I	Language Course – II (LC)	Idaikaala llakiyamum Pudhinamum	22ULT2	5	3	3	25	75	100
			Hindi Literature & Grammar – II	22ULH2						
			Poetry, Textual Grammar and Alankara	22ULS2						
			Basic French–II	22ULF2						
	II	English Language Course - II (ELC)	Functional English for Effective Communication – II	22UE2	6	3	3	25	75	100
	III	Core Course – II (CC)	Programming in Java	22UCA2CC2	5	5	3	25	75	100
		Core Practical - II (CP)	JAVA Programming (P)	22UCA2CC2P	3	3	3	40	60	100
		Core Course -III (CC)	Data Structures	22UCA2CC3	3	3	3	25	75	100
		First Allied Course – III (AC)	Operations Research	22UCA2AC3	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course - II(AECC)	Environmental Studies	22UGEVS	2	2	-	100	-	100
		Ability Enhancement Compulsory Course - III(AECC)	Innovation and Entrepreneurship	22UGIE	2	1	-	100	-	100
		Extra Credit Course	SWAYAM		As per UGC Recommendation					
		Total			**30**	**23**				**800**

III	I	Language Course - III (LC)	Kaapiyamum Nadagamum	22ULT3	5	3	3	25	75	100
			Hindi Literature & Grammar - III	22ULH3						
			Prose,Textual Grammarar and Vakyarachana	22ULS3						
			Intermediate French-I	22ULF3						
	II	English Language Course - III (ELC)	Learning Grammar Through Literature – I	22UE3	6	3	3	25	75	100
	III	Core Course – IV (CC)	Database Management Systems	22UCA3CC4	6	6	3	25	75	100
		Core Practical – III (CP)	Database Management Systems (P)	22UCA3CC3P	3	3	3	40	60	100
		Second Allied Course - I (AC)	Financial Accounting	22UCA3AC4	4	3	3	25	75	100
		Second Allied Course - II (AP)	Computer Applications in Business (P)	22UCA3AC5P	4	3	3	40	60	100
	IV	Generic Elective Course - I (GEC)	Animation Tools - I (P)	22UCA3GEC1P	2	2	3	40	60	100
			Basic Tamil - I	22ULC3BT1				25	75	
			Special Tamil - I	22ULC3ST1						
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
		Total			**30**	**23**				**700**

15 Days INTERNSHIP during Semester Holidays

IV	I	Language Course - IV (LC)	Pandaiya Illakiyamum Urainadaiyum	22ULT4	6	3	3	25	75	100
			Hindi Literature & Functional Hindi	22ULH4						
			Drama, History of Drama Literature	22ULS4						
			Intermediate French – II	22ULF4						
	II	English Language Course – IV (ELC)	Learning Grammar Through Literature - II	22UE4	6	3	3	25	75	100
	III	Core Course – V(CC)	Programming in Python	22UCA4CC5	6	6	3	25	75	100
		Core Practical – IV (CP)	Programming in Python (P)	22UCA4CC4P	4	4	3	40	60	100
		Second Allied Course- III (AC)	Business Communication	22UCA4AC6	4	3	3	25	75	100
		Internship	Internship	22UCA4INT	-	2	-	100	-	100
	IV	Generic Elective Course - II (GEC)	Animation Tools- II (P)	22UCA4GEC2P	2	2	3	40	60	100
			Basic Tamil - II	22ULC4BT2				25	75	
			Special Tamil - II	22ULC4ST2						
		Skill Enhancement Course – I(SEC)	Documentation and Presentation Tools (P)	22UCA4SEC1P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
		Total			**30**	**25**				**800**

Sem	Part	Course	Title	Code	Hrs	Cr		CIA	ESE	Total
V	III	Core Course – VI (CC)	Programming in PHP	22UCA5CC6	6	6	3	25	75	100
		Core Practical – V (CP)	PHP with MYSQL (P)	22UCA5CC5P	4	4	3	40	60	100
		Core Course – VII (CC)	Software Engineering	22UCA5CC7	6	6	3	25	75	100
		Core Course – VIII (CC)	Data Mining	22UCA5CC8	5	5	3	25	75	100
		Discipline Specific Elective – I (DSE)	MATLAB (P)	22UCA5DSE1AP	5	4	3	40	60	100
			Data Mining (P)	22UCA5DSE1BP						
			R Programming (P)	22UCA5DSE1CP						
	IV	Ability Enhancement Compulsory Course – IV (AECC)	UGC Jeevan Kaushal - Professional Skills	22UGPS	2	2	-	100	-	100
		Skill Enhancement Course – II (SEC)	Data Analytics using Excel (P)	22UCA5SEC2P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM		As per UGC Recommendation					
		Total			**30**	**29**				**700**
VI	III	Core Course – IX (CC)	Computer Networks	22UCA6CC9	6	6	3	25	75	100
		Core Course – X (CC)	Operating Systems	22UCA6CC10	5	5	3	25	75	100
		Core Practical– VI (CP)	Web Applications (P)	22UCA6CC6P	3	3	3	40	60	100
		Core Course – XI (CC)	Cyber Security	22UGCS	5	4	3	25	75	100
		Discipline Specific Elective – II (DSE)	A. Internet of Things	22UCA6DSE2A	5	4	3	25	75	100
			B. Web Technology	22UCA6DSE2B						
			C. Data Mining	22UCA6DSE2C						
		Project	Project Work	22UCA6PW	5	4	-	-	100	100
	V	Gender Studies	Gender Studies	22UGGS	1	1	-	100	-	100
		Extension Activity		22UGEA	0	1	0	-	-	-
		Total			**30**	**28**				**700**
		Grand Total			**180**	**150**				**4400**

COURSES & CREDITS FOR BCA PROGRAMME

Part	Course	No. of Courses	Credits	Total Credits
I	Tamil / Other Language	4	12	12
II	English	4	12	12
III	Core (Theory & Practical)	17	77	109
	Project Work	1	4	
	Internship	1	2	
	First Allied	3	9	
	Second Allied	3	9	
	DSE	2	8	
IV	GEC	2	4	15
	SEC	2	4	
	AECC-I -Universal Human Values	1	2	
	AECC-II-Environmental Studies	1	2	
	AECC-III-Innovation and Entrepreneurship	1	1	
	AECC-IV Professional Skills	1	2	
V	Gender Studies	1	1	02
	Extension Activities	-	1	
		4400		**150**

SEMESTER - I

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
22UCS1CC1/ 22UCA1CC1/ 22UIT1CC1	**PROGRAMMING IN C**	**CORE**	**5**	**5**

Course Objectives

- To understand the basics of C language
- To get the deep knowledge of programming using C language
- To develop logics which will help them to create programs and applications in C
- Enhance skill on problem solving by constructing algorithms

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Define the basic concepts of C Programming	K1
CO2	Illustrate the components of C programming	K2
CO3	Build algorithms and data structures swiftly and faster computation using programs	K3
CO4	Apply the knowledge of programming concepts to develop programs	K4
CO5	Solve real time problems using C	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	1	1	2	2	2	3	2
CO2	3	2	3	1	1	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	2	2	2	2	3	3
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Developing a program in C:** Algorithm – Pseudocode - Flowchart- Planning a C program- Writing a C program- Compile and Run a C Program- **Overview of C:** – Structure of C program – Character set-Tokens – Data types – Variables – Declaration of variables - symbolic constant – Operators and Expressions	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Managing Input and Output Operations:** Reading and Writing a character -Formatted Input and Output. **Decision Making and Branching:** If, Switch, The ?: operator - The GoTo Instruction – **Decision Making and Looping:** Introduction – While, DO, For Statements –Jumps in Loops.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Array:** One dimensional array – Two and multidimensional array – Character array – String functions – **User-Defined Functions:** Need for User -Defined Functions –A Multi-Function Program-Elements of User-Defined Functions-Definition of Functions –Return values and Their Types-Function Calls- Function Declaration- Category of Functions – Nesting of Functions - Recursion - Storage Class-The scope and lifetime of variables in functions.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Structures and Unions:** Structure definition – Structure Initialization – Array of structure – Array within structure –Structure within Structure-Union– **Pointers:** Understanding pointers - Accessing the address of a variable - Declaring and Initializing pointers - Accessing a variable through its pointers - Pointer Expressions - Pointers and Arrays - Pointers and Character strings.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**File Management:** Defining and Opening File –Closing a File – I/O operations on Files – error handling during I/O operations – Random Access to Files- Command Line Arguments.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**UNIT VI - Self Study for Enrichment** (Not included for End Semester Examinations) Develop algorithms for real time scenario, Area calculations, Conversion programs, swapping numbers (with and without using temporary variable). Programs for checking eligibility, Triangle formation, Sum of numbers, sum of series, Array manipulations (Sorting, searching, insert, delete and merging), String handling programs, Dynamic memory management using pointers, Employee pay bill preparation using Files.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

1. Balagurusamy.E. (2017). Programming in ANSI C, 7thEdition, Mc Graw Hill Education New Delhi.

2. Byron Gottfried. (2018). Programming with C, 4th Edition, Tata McGraw Hill.

References

1. Yashavant Kanetkar, (2020). Let Us C, 16thEdition, BPB Publications, New Delhi.

2. Ashok N. Kamthane, Amit Ashok Kamthane (2015). Programming in C, 3rd Edition, Pearson India Education Services Pvt. Ltd.

Web References

1. https://www.learn-c.org/
2. https://www.cprogramming.com/
3. https://www.tutorialspoint.com/cprogramming/index.htm

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designers

1. Dr. M. Anandhi, Associate Professor, Department of Information Technology.
2. Ms. R. Sridevi, Assistant Professor, Department of Computer Applications.

Semester I	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCA1CC1P	C PROGRAMMING – PRACTICAL	CORE	3	3

Course Objectives

- To introduce students to the basic knowledge of programming fundamentals of C language.
- To impart writing skill of C programming to the students and solving problems.
- To impart the concepts like looping, array, functions, pointers and structure.

Course Outcome and Cognitive Level Mapping

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

CO NUMBER	CO STATEMENT	COGNITIVE LEVEL
CO1	Identify the logic for a given problem	K1,K2
CO2	Recognize the syntax and construction of C programming code	K1,K2
CO3	Apply the steps involved in compiling, linking and debugging C code	K3,K4
CO4	Analyze the concepts of iteration or looping, branching, array, structure, union and pointers	K4
CO5	Create C programs using all the concepts that have been covered in the theory course	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	2	2
CO3	3	3	3	3	3	3	3	3	2	1
CO4	3	3	3	2	2	3	3	2	2	1
CO5	3	3	3	3	2	3	3	3	2	2

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

List of Practicals

1. Simple Programs
   a. Create a C program to display "This is my first C Program"
   b. Create a C program to add two numbers and display its sum
   c. Create C program to evaluate each of the following equations.
      (i) $E = MC^2$.   (ii) $S = ut+1/2a$

2. Selection Structures
   a. Create a C Program to Check Whether a Number is Prime or not
   b. Create a C program to swap values of two variables with and without using third variable
   c. Create a C program to compute grade of students using if else adder. The grades are assigned as followed:

Marks	Grade
Marks < 50	F
$50 \leq$ marks < 60	C
$60 \leq$ marks < 70	B
$70 \leq$ marks < 80	B+
$80 \leq$ marks < 90	A
$90 \leq$ marks ≤ 100	A+

3. Iterative Structures
   a. Create a C program to print N Natural numbers
   b. Create a C program to reverse a given integer

4. Arrays
   a. Create a C program to find the largest and smallest element in Array
   b. Create a C program to find the addition of two matrices

5. Function
   a. Create a C program to calculate factorial of a number using recursion
   b. Create a C program to find power of a number using recursion

6. Pointers
   a. Create a C program to find the length of string using pointer
   b. Create a C program to copy one string to another using pointer

7. Structures
   a. Create a C program to read and print Student's Details using Structure

8. Files
   a. Create a C Program to print the strings using command Line Arguments

Web References

1. https://www.programiz.com/c-programming/examples
2. https://beginnersbook.com/2015/02/simple-c-programs/
3. https://www.tutorialgateway.org/c-programming-examples/
4. https://www.studytonight.com/c/programs/

Pedagogy

Power Point Presentations, Demonstrations, Seminars and Practical Sessions.

Course Designer

Ms. V.Infine Sinduja, Assistant Professor, Department of Computer Applications.

FIRST ALLIED COURSE –I (AC)
ESSENTIAL MATHEMATICS
(For B.Sc Computer Science , B.Sc Information Technology & BCA)
(2022-2023 and Onwards)

Semester I	Internal Marks:25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
22UCS1AC1/ 22UCA1AC1/ 22UIT1AC1	**ESSENTIAL MATHEMATICS**	**ALLIED**	**4**	**3**

Course Objective

- **Apply** the basic concepts of Differentiation, Integration and their applications.
- **Compute** mathematical quantities using ordinary and partial differential equations.
- **Explore** fundamental concepts in graph theory.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Remember and recall the basic concept of essential mathematics.	**K1**
CO2	Illustrate the various notions in the respective streams .	**K2**
CO3	Apply the different terminologies of essential mathematics.	**K3**
CO4	Classify the solution of mathematical problems using various techniques.	**K4**
CO5	Examine the solution of mathematical problems.	**K4**

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	2
CO3	3	2	3	3	3	3	3	3	2	2
CO4	3	2	2	3	3	3	3	3	3	2
CO5	3	2	3	3	3	3	3	3	2	2

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation ¬
"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Matrices** Matrix – Special types of matrices – Scalar multiplication of a matrix – Equality of matrices – Addition of matrices – Subtraction – Multiplication of Matrices – Inverse matrix– Relation between adjoint and inverse matrices – Solution of simultaneous equations – Rank of a matrix – A system of m homogeneous linear equations in n unknowns – System of non-homogeneous linear equations – Eigen values and Eigenvectors – Similar matrices – Cayley-Hamilton Theorem (proof not needed) – Simple applications only	12	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4
II	**Differentiation** Maxima and Minima (Problems Only) –Points of inflexion. **Partial differentiation** Functions of function rule – Total Differential Coefficient – A Special case – Implicit Functions – Homogeneous functions – Euler's Theorem (proof not needed) – Simple problems only.	12	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4
III	**Integration** Integration of Rational algebraic functions – Rule (a) – Rule (b): Type i: $\int \frac{dx}{ax^2+bx+c}$, Type ii: $\int \frac{lx+m}{ax^2+bx+c} dx$ – Integration of Irrational functions : Case (ii) Integration of the form $\int \frac{px+q}{\sqrt{ax^2+bx+c}}$ – Type $\int \frac{dx}{a+b\cos x}$ – Properties of definite integrals.	12	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4
IV	**Differential Equations** Linear Differential Equation with constant coefficients – The Operators D and D^{-1} – Particular Integral – Special methods of finding P.I.: X is of the form (a) $e^{\alpha x}$ (b) $\cos\alpha x$ or $\sin\alpha x$, where α is a constant (c) x^m (a power of x), m being a positive integer (d) $e^{ax}V$, where V is any function of x.	12	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4
V	**Graph Theory** Introduction – Definition of Graphs – Applications of Graphs – Finite and infinite graphs – Incidence and Degree – Isolated Vertex, Pendant Vertex and Null Graph. **Path and Circuits** Isomorphism – Subgraphs – Walks, Paths and Circuits – Connected Graphs, Disconnected Graphs and Components – Euler graphs.	12	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4
VI	**Self-Study for Enrichment** **(Not included for End Semester Examination)** Symmetric matrix – Skew symmetric matrix – Hermitian and skew Hermitian matrices Concavity and Convexity– Integration by parts – Linear equation – Hamiltonian Paths and Circuits.	-	CO1, CO2, CO3, CO4, CO5	K1,K2,K3, K4

Text Books

1. T.K.Manicavachagom Pillay, T.Natarajan, K.S.Ganapathy.(2015). *Algebra, Volume II.* S. Viswanathan (Printers & Publishers) Pvt., Ltd.

2. S.Narayanan, T.K.Manicavachagom Pillay.(2015*).Calculus,Volume I*. S. Viswanathan (Printers & Publishers) Pvt., Ltd.

3. S.Narayanan, T.K.Manicavachagom Pillay.(2015*).Calculus,Volume II*. S. Viswanathan (Printers & Publishers) Pvt., Ltd.

   4. S.Narayanan, T.K.Manicavachagom Pillay.(2015*).Calculus,Volume III*. S. Viswanathan (Printers & Publishers) Pvt., Ltd.

5. Narsingh Deo. (2003). *Graph Theory with applications to Engineering and Computer*. Prentice Hall of India Private Limited

   UNIT-I Chapter 2: Section 1 to 5, 7, 8, 10 to 16[1]

   UNIT-II Chapter V: Section 1.1 to 1.5[2], Chapter VIII: Section 1.2 to 1.6[2]

   UNIT-III Chapter 1: Section 7.1 to 7.3, 8 (CASE II), 9, 11[3]

   UNIT-IV Chapter 2: Section 1 to 4[4]

   UNIT-V Chapter 1: Section 1.1 to 1.5[5], Chapter 2: Section 2.1, 2.2, 2.4 to 2.6[5]

Reference Books

1. A.Singaravelu. (2003). *Allied Mathematics*. A.R.Publications
2. P.R.Vittal. (2014). *Allied Mathematics*. Margham Publications, Chennai.
3. S.Arumugam and S.Ramachandran.(2006*). Invitation to Graph Theory*. Sci Tech Publications (India) Pvt Ltd., Chennai

Weblinks

1. https://youtu.be/rowWM-MijXU
2. https://youtu.be/TQvxWaOnrqI
3. https://youtu.be/pvLj1s7SOtk
4. https://youtu.be/Gxr3AT4NY_Q
5. https://youtu.be/xlbbefbYLzg
6. https://youtu.be/b0RJkIBhfEM
7. https://youtu.be/s5KZw1Eo

Pedagogy

Assignment, Seminar, Lecture, Quiz, Group discussion, Brain storming, e-content.

Course Designers

1. Dr. V. Geetha
2. Dr. S. Sasikala

FIRST ALLIED COURSE-II (AC)

NUMERICAL ANALYSIS AND STATISTICS

(For B.Sc Computer Science , B.Sc Information Technology & BCA)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UCS1AC2/ 22UCA1AC2/ 22UIT1AC2	NUMERICAL ANALYSIS AND STATISTICS	ALLIED	4	3

Course Objective

- **Understand** the implementation of various methods of Numerical Analysis.
- **Organize** and **summarize** the statistical data.
- **Analyze** and **evaluate** the strengths of the conclusions based on data.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand the list of basic ideas of Numerical Methods and Statistics.	K1, K2
CO2	Solve the problems using various methods and also classify the given datas.	K2, K3
CO3	Identify the conceptual collection and classification of variables.	K3
CO4	Analyze the accuracy and graphical representation of statistical datas.	K4
CO5	Support the implementation of numerical methods and statistical datas.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	2	3	2
CO2	3	3	2	2	2	3	2	3	2	3
CO3	2	3	3	2	2	2	3	3	2	3
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	2	3	3	3	2	2	3	3

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation¬
"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Solution of Algebraic & Transcendental Equations:** 　　　Introduction – The Bisection Method – The Iteration Method – Newton-Raphson Method (Problems Only) **Interpolation:** 　　　Finite Differences: Forward Differences, Backward Differences – Newton's Formulae for Interpolation – Interpolation with unevenly spaced Points: Lagrange's Interpolation formula	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Numerical Integration:** 　　　Numerical Integration: Simpson's 1/3-Rule – Simpson's 3/8-Rule (proof not needed). **Linear Systems of Equations:** 　　　Solution of Linear Systems–Direct Methods: Gaussian Elimination Method – Solutions of Linear Systems – Iterative Methods (Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Numerical solution of Ordinary Differential Equations:** 　　　Introduction – Euler's Method – Modified Euler's Method – Runge-Kutta Methods – Predictor - Corrector Methods : Adams-Moulton Method	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Measures of Central Tendency:** 　　　Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean. **Measures of Dispersion:** 　　　Mean Deviation – Standard Deviation (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Correlation:** 　　　Introduction – Meaning of Correlation – Scatter Diagram – Karl Pearson's co-efficient of Correlation – Rank Correlation: Spearman's Rank Correlation Coefficient (Derivation not needed and Simple Problems Only). **Linear Regression:** 　　　Introduction – Linear Regression (Derivation not needed and Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**Self Study for Enrichment:** **(Not included for End Semester Examination)** 　　　The method of False Position & Central Differences - Trapezoidal rule - Solution by Taylor's Series and Milne's Method - Range – Quartile Deviation - Rank Correlation (Repeated Ranks).	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Sastry S. S. (1998). Introductory methods of Numerical Analysis, Third Edition. Prentice Hall of India Private Limited.

2. Gupta. S.C & Kapoor, V.K (2007). Fundamentals of Mathematical Statistics. Sultan Chand & sons, New Delhi.

UNIT – I	Chapter 2: Sections 2.1 - 2.3(Omit 2.3.1), 2.5(Omit 2.5.1) [1]
	Chapter 3: Sections 3.3 (Omit 3.3.4), 3.6, 3.9(3.9.1only) [1]
UNIT – II	Chapter 5: Sections 5.4(5.4.2 & 5.4.3 only) [1]
	Chapter 6: Sections 6.3(6.3.2 only) & 6.4 [1]
UNIT – III	Chapter 7: Sections 7.1, 7.4- 7.6 (Omit 7.4.1 & 7.6.2) [1]
UNIT – IV	Chapter 2: Sections 2.5 - 2.9, 2.13 (Omit 2.13.1 & 2.13.2) [2]
UNIT –V	Chapter 10: Sections 10.1 - 10.4, 10.7(10.7.1 Only) [2]
	Chapter 11: Sections 11.1 & 11.2 [2]

Reference Books

1. Jain M. K, Iyengar S. R.K. and Jain R.K. (1999). Numerical Analysis Numerical Methods for Scientific and Engineering Computations. New Age International Private Limited.

2. Froberg C.E. (1979). Introduction to Numerical Analysis. II Edition. Addison Wesley

Web Links

1. https://youtu.be/qCzUXav5Nk
2. https://youtu.be/r6MTvrI8SO4
3. https://youtu.be/s05dONL4xAs
4. https://youtu.be/XaHFNhHfXwQ
5. https://youtu.be/zPG4NjIkCjc

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

1. Dr.R.Buvaneswari
2. Ms.A.Gowri Shankari

SEMESTER II

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCA2CC2	PROGRAMMING IN JAVA	CORE	5	5

Course Objectives

- To develop logics which will help them to create programs
- To get a deep knowledge of programming using JAVA language
- To understand the basics of OOPs concepts
- Enhance problem solving skill

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, the students will be able to	Cognitive Level
CO1	Recite the basic programming skills	K1
CO2	Understand the Java features	K2
CO3	Analyze OOPs concepts	K4
CO4	Apply the programming skills in various domains	K3
CO5	Solve real time problems using Java	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	2	2	2	2	2
CO2	3	2	3	1	1	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Fundamentals of Object-Oriented Programming:** Basic Concepts of Object-Oriented Programming - Benefits and Applications of OOP. **Java Evolution:** Java Features - Java Environment - **Overview of Java Language:** Java Program Structures, Statements – Implementing A Java Program – Java Virtual Machine –. **Constants, Variables and Data Types:** Constants- Variables – Data Types – Declaration of Variables – Giving Values to Variables – Scope of Variables – Symbolic Constants- Type Casting- Getting Values of Variables.	15	CO1, CO2, CO3	K1, K2, K3, K4
II	**Operators and Expressions:** Introduction - Arithmetic Operators- Relational Operator - Logical Operator - Assignment Operator-increment and decrement Operator-Conditional Operator - Bitwise Operator- Special Operator - **Decision Making and Branching:** Introduction - Decision making with if statement-Simple if statement -The if ..else Statement-Nesting of if …else statements- The switch statement - The Conditional Operator(?:Operator) -**Decision Making and Looping :** While, Do, For Statement, Jump In Loops, Return Statement.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Classes, Objects and Methods**: Defining A Class – Fields and Methods Declaration - Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – Inheritance**:** Extending A Class – Overriding Methods – Final Variables, Methods and Classes – Abstract Methods and Classes – Visibility Control. **Arrays, Strings and Vectors**: Creating Arrays – One and two Dimensional Arrays Strings – Vectors. **Interfaces: Multiple Inheritance:** Introduction - Defining Interfaces - Extending Interfaces-Implementation Interfaces - Accessing Interfaces Variables.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Packages**: Introduction - Java Packages - Using System Packages- Naming conventions - Creating packages - Accessing a package - Using aPackage - Adding a class to a package - **Multithreaded Programming:**Creating Threads – Extending the Thread Class – Thread- Life Cycle ofThread-Using Thread Method-Thread Priority – Synchronization. **Managing Errors and Exceptions:** Introduction - Types of Errors - Exceptions-Syntax of Exception Handling code-Multiple Catch Statements.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Graphics Programming using AWT, Swing and Layout Manager:** The Graphics Class- Lines and Rectangles- Circles and Ellipses-Drawing Arcs - Drawing Polygons – Introduction to AWT Package – Window Fundamentals – Layout Managers – Introduction to Swing Package – Components and Containers – AWT versus Swing - **Database Connectivity**: Introduction – JDBC Architecture – Discussion with Example – Overview of JDBC Components.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**UNIT VI** - **Self Study for Enrichment** **(Not to be included for External Examination)** Comment Line Arguments – Enumerated Types - Finalizer Methods - **Applet Programming:** Building Applet Code - Applet Life Cycle - Creating and Executable Applet – Designing a Web Page using Applet – **Managing Input/Output Files in Java:** Stream Classes **–** Byte Stream Classes – Character Stream Classes – Creation of Files – Reading/Writing Characters – Reading/Writing bytes.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

E. Balagurusamy,(2019). "Programming with JAVA", 6th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

References
1. S.Sagayaraj, R.Denis, P.Karthik and D.Gajalakshmi,(2017)."Java programming",Universities Press.
2. Schildt Herbert,(2011)."Java :The Complete Reference", 8th Edition Tata McGraw-Hill.
3. C.Muthu, (2008)."Programming with JAVA", Second Edition, McGraw HillEducation
4. Ken Arnold gosling and Davis Holmen,(2005). "The JAVA Programming Language",4th Edition, Addision Wesley Pearson Education Publication.

Web References
1. https://www.javatpoint.com/java-tutorial
2. https://www.guru99.com/java-tutorial.html
3. https://www.w3schools.com/java/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms. A. Jabeen, Assistant Professor, Department of Computer Applications.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
22UCA2CC2P	**JAVA PROGRAMMING – (P)**	**CORE**	**3**	**3**

Course Objective

● To impart practical training on Java Programming

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, the students will be able to	Cognitive Level
CO1	Abilityto write the programs using Classes and Objects	K3
CO2	Understand use of Inheritance and Interfaces	K2
CO3	Recognize Package concepts, String and File Handling functions	K2
CO4	Apply Multithreading and Exception Handling concepts.	K3
CO5	Create Swing programs and JDBC connection	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	1	1	2	2	3	3	2
CO2	3	2	3	1	1	3	3	3	3	2
CO3	3	3	3	2	2	3	3	3	3	3
CO4	3	2	3	2	2	2	2	3	3	3
CO5	3	3	3	2	2	3	3	3	2	3

"1" – Slight (Low) Correlation　　　　"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation　　"-" indicates there is no correlation.

List of Practical

1.　Classes and Objects

2.　Inheritances

3.　Interfaces

4.　Packages

5.　String Handling

6.　File Handling

7.　Multithreading

8.　Menu and Dialog Box

9.　Swing Components

10.　GUI Application with JDBC

Web References

1.   https://www.programiz.com/java-programming/examples
2.   https://www.geeksforgeeks.org/java-programming-examples/
3.   https://www.w3schools.com/java/java_examples.asp
4.   https://www.w3schools.com/java/

Pedagogy
Demo and Discussion.

Course Designer

Ms. A. Anandhavalli, Assistant Professor, Department of Computer Applications.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCA2CC3	DATA STRUCTURES	CORE	3	3

Course Objectives

- To understand the basic concepts of various data structures
- To demonstrate a familiarity with data structures
- To articulate the essential components and operations of the data structures

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, the students will be able to	Cognitive Level
CO1	Define the basic concepts of Data Structure	K1
CO2	Demonstrate the operations of Linear and Non-Linear Structure	K2
CO3	Examine the Data Structure operations	K3
CO4	Analyse the various types of Data Structure	K4
CO5	Solve the problem using Different Structures	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	1	1	2	2	2	2	2
CO2	3	2	2	2	1	2	2	2	2	2
CO3	3	3	3	2	2	2	3	2	3	2
CO4	3	3	3	2	2	2	3	2	3	2
CO5	3	3	3	2	2	2	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation   "-" indicates there is no Correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Basic Terminology: Introduction and Overview:** Definition-Concept of Data Structures- Overview of Data Structures-Implementation of Data Structures. **Arrays:** Definition-Terminology-One-dimensional Array – Two-dimensional Arrays.	9	CO1, CO2, CO3, CO4, CO5	K1, K2, K3
II	**Stack & Queue** : Overview of Stacks and Queues-Operations on Stack-ADD and DELETE Procedure-Operations on Queue- ADD and DELETE Procedure - Circular Queue – Evaluation of Expressions	9	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Linked Lists** : Overview of Linked list – Representation of Linked List in Memory –Operations: Creating a Linked List-Insertion into a Linked List – Deletion from a Linked List-Polynomial addition – Linked Stacks and Queues.	9	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Trees & Graphs :**Trees Terminology – Binary tree representations – Tree Traversal –Graph Terminology – Memory Representations of Graphs – Traversals.	9	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Sorting & Searching** : Searching : Sequential Search – Binary Search. Sorting : Insertion Sort- Heap Sort-Quick Sort.	9	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment :** (Not to be included for End Semester Examination) Multiple Stacks and Queues - Threaded Binary Trees – Connected Components and Spanning Trees.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook
1. Debasis Samanta (2018). Classic Data Structures, Second Edition, PHI Learning Private Limited, New Delhi. (Unit I)
2. Ellis Horowitz, Sartaj Sahni (2008). Fundamentals of Data Structure, Golgotia Publications, New Delhi.(Unit II,III,IV, V)

References
1. Seymour Lipschutz (2011). Data Structures with C, McGraw Hill Education, New York.
2. Ashok N. Kamthane (2011).Introduction to Data Structure in C, Pearson Education, Singapore.

Web References

1. https://www.geeksforgeeks.org/data-structures/
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

Pedagogy

Chalk and Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

1. Dr. R. Brendha, Associate Professor, Department of Computer Applications.

FIRST ALLIED COURSE –III (AC)

OPERATIONS RESEARCH

(For B.Sc Computer Science, Computer Science with Cognitive Systems, BCA &B.Sc Information Technology)

(2022-2023 and Onwards)

Semester II	Internal Marks:25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
22UCS2AC3/ 22UCG2AC3/ 22UCA2AC3/ 22UIT2AC3/	**OPERATIONS RESEARCH**	**ALLIED**	**4**	**3**

Course Objective

- **Understand** the various features of Operations research.
- **Analyze** the optimum solutions using Operations research.
- **Explore** the concepts of Operations research in real life problems.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Define the various techniques of Operations research.	**K1**
CO2	Illustrate the various notions in the respective streams.	**K2**
CO3	Identify the different terminologies of Operations research	**K3**
CO4	Analyze the solutions of mathematical problem using specific techniques.	**K4**
CO5	Simplify the optimum solutions of a mathematical problem.	**K4**

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	2	3	3	3	2	3
CO2	3	2	3	3	2	3	3	3	3	2
CO3	3	2	3	3	2	3	2	3	2	2
CO4	3	2	2	2	2	3	3	2	3	2
CO5	3	2	3	2	2	3	3	3	2	2

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation ¬

"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Operations Research** Introduction-Origin and Development of O.R.- Nature and Features of O.R.- Scientific Method in O.R.- Modelling in Operations Research - Advantage and Limitation of Models- General Solution Methods for O.R. Models- Methodology of Operations Research- Operations Research and Decision Making **Linear Programming Problem- Mathematical Formulation** Introduction-Linear programming Problem Mathematical Formulation of the problem -Illustrations on Mathematical Formulation of LPPs.(simple problems only) **Linear programming problem-graphical Solution and Extension** Introduction- Graphical Solution Method- General Linear Programming Problem- Canonical and Standard Forms of LPP.	12	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4
II	**Linear Programming Problem-Simplex Method** Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm-Use of Artificial Variables-Big M method.(simple problems only).	12	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4
III	**Transportation problem** Introduction-LP Formulation of the Transportation Problem- Existence of Solution in T.P-TheTransportation Table-Loops in Transportation Table-Solution of a Transportation Problem -Finding an Initial Basic Feasible Solution-Test for Optimality-Economic interpretation of u_j's and v_j's - Degeneracy in Transportation Problem-Transportation Algorithm (MODI method), (simple problems only). **Assignment Problem** Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem-Special Cases in Assignment Problems (simple problems only).	12	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4
IV	**Sequencing problem** Introduction-Problem of Sequencing-Basic Terms Used in Sequencing- Processing n Jobs through Two Machines- Processing n Jobs through k Machines (problems only).	12	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4
V	**Network Scheduling by PERT/CPM** Introduction- Network: Basic Components-Logical Sequencing- Rules of Network Construction-	12	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4

	Concurrent Activities - Critical Path Analysis - Probability Considerations in PERT.			
VI	**Self-Study for Enrichment** **(Not included for End Semester Examination)** Application of Operations Research. – Two-Phase method – The Travelling Salesman problem – Processing 2 Jobs through k Machines –. Inventory Models(without shortage)	-	CO1,CO2, CO3,CO4, CO5	K1,K2,K3, K4

Text Books

1. Kanti Swarup, P.K. Gupta, Manmohan.(2019). *Operations research, Sultan Chand Publications.*

Chapters and Sections

UNIT–I   Chapter 1:   Sections 1:1 – 1:9

               Chapter 2:   Sections 2:1 – 2:4

               Chapter 3:   Sections 3:1 – 3:5

UNIT II   Chapter 4:   Sections 4:1 – 4:4

UNIT-III   Chapter 10: Sections 10:1 – 10:3, 10:5, 10:6, 10:8 – 10:13

               Chapter 11: Sections 11:1 – 11:4

UNIT-IV   Chapter 12: Sections 12:1 – 12:5

UNIT-V   Chapter 25: Sections 25:1 – 25:7

Reference Books

1. Hamdy A.Taha (2017),*Operations Research An Introduction,* Pearson India Education services PVT Ltd.

2. Premkumar Gupta, Hira D.S.(2004)*, Operations Research*, S.Chand & Company Ltd, New Delhi.

3. Chandrasekhara Rao.K,Shanti Lata Mishra(2008), *Operations Research,* Narosa Publishing House PVT Ltd, New Delhi.

Web References

8.   https://www.britannica.com/topic/operations-research

9.   https://byjus.com/maths/linear-programming/

10.   https://www.gatexplore.com/transportation-problem-study-notes/

11.   https://youtu.be/rowWM-MijXU

12.   https://youtu.be/TOvxWaOnrqI

13.   https://youtu.be/RTX-ik_8i-k

14.   https://youtu.be/s5KZw1EpBEo
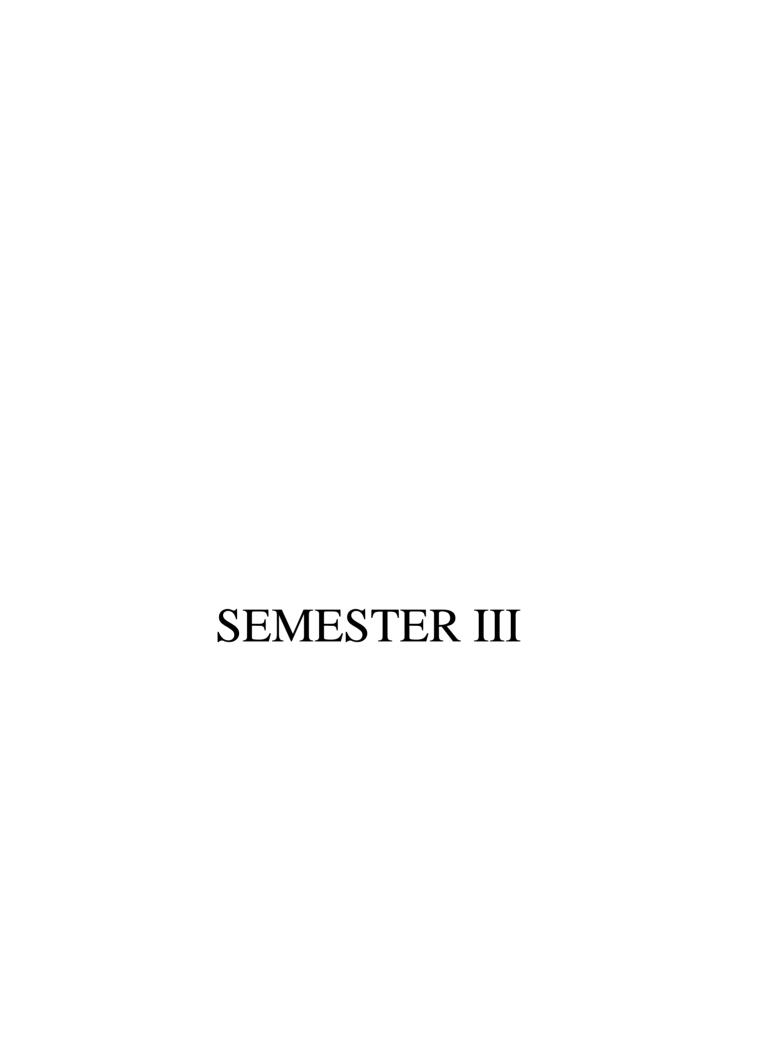
Pedagogy

Power point presentation, Group discussion, Seminar, Assignment.

Course Designers

Dr. V. Geetha

Dr. S. Sasikala

SEMESTER III

Semester III	Internal Mark: 25			External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week		CREDITS
22UCA3CC4	DATABASE MANAGEMENT SYSTEMS	CORE	6		6

Course Objective

- To understand the basic concepts and the applications of database systems
- To provide the basics of SQL and construct queries using SQL, E-R model and Normalization

Course Outcomes and Cognitive Level Mapping

Cos	CO STATEMENTS On the successful completion of the course, students will be able to	COGNITIVE LEVEL
CO1	Define the basic concepts of database design, architecture and its data model	K1
CO2	Illustrate the structure of Relational database	K2
CO3	Apply the various queries in the database	K3
CO4	Examine the database design and E-R model	K4
CO5	Explain the concepts of Relational Database Design	K2,K5

Mapping of CO with PSO and PO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to Database System Concepts:** Introduction – Database-System Applications – Purpose of Database Systems – View of Data: Data Abstraction – Instances and Schemas – Data Models – **Relational Databases**: Tables – Data-Manipulation Language – Data-Definition Language – Database Design: Design Process – The Entity – Relationship Model – Normalization – **Data Storage and Querying**: Storage Manager – The Query Processor – Transaction Management – Database Architecture – Database Users and Administrators: Database Users and User Interfaces – Database Administrator.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Introduction to Relational Model and SQL:** Structure of Relational Databases – Database Schema – Keys – Schema Diagrams – Relational Query Languages – Relational Operations - **Introduction to SQL**: Overview of the SQL Query Language – **SQL Data Definition**: Basic Types – Basic Schema Definition – Basic Structure of SQL Queries: Queries on Single Relation – Queries on Multiple Queries - The Natural Join.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Introduction to SQL:** **Additional Basic Operations**: The Rename Operation – String Operations – Attributes Specification in Select Clause – Ordering the Display of Tuples – Where clause Predicates – Set Operations: The Union Operation – The Intersect Operation - Except Operation – Null Values – **Aggregate Functions**: Basic Aggregation – Aggregation with Grouping - The Having Clause - Nested Sub queries: Set Membership – Set Comparison – Modification of the Database.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Database Design and E-R Model** **The Entity – Relationship Model**: Entity Sets – Relationship Sets – Attributes – Constraints: Mapping Cardinalities – Keys – **Entity-Relationship Diagrams**: Basic Structure – Mapping Cardinality - Complex Attributes - Weak Entity Sets – **Design Alternative**: Smaller Schemas - Atomic Domains and First Normal Form Decomposition using Functional Dependencies: Keys and Functional Dependencies - Boyce-Codd Normal Form - BCNF and Dependency Preservation – Third Normal Form	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Relational Database Design** **Functional Dependency Theory**: Closure of a set of Functional Dependencies - Closure of Attribute	18	CO1, CO2, CO3,	K1, K2, K3,

			CO4, CO5	K4, K5
	Sets - Canonical Cover – Lossless Decomposition – Dependency Preservation. **Transaction Management:** Transaction Concepts-A Simple Transaction Model-Storage Structure-Transaction Atomicity & Durability-Transaction Isolation.			
VI	**Self-Study for Enrichment (Not to be included for End Semester Examination)** SQL data types and Schemas - Reduction to Relational Schemas - ER design issues - E-R diagram for the University Enterprise.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

Abraham Sliberschatz ,Henry F Korth & Sudharsan (2013). Database System

Concepts, 6th Edition ,McGraw Hill Education(India) Private Limited.

References

- Alexis Leon, Mathews Leon (2009). Essentials of Database Management Systems, McGraw Hill Education India Pvt Ltd.

- Peter Rob, Carlos Coronel (2009). Database System Concepts, Lengage Learning.

Web References

- https://beginnersbook.com/2015/04/dbms-tutorial/

- https://www.studytonight.com/dbms/

- https://www.tutorialspoint.com/dbms/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr. Lakshna Arun, Associate Professor, Department of Computer Applications.

Semester III	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCA3CC3P	Database Management Systems (P)	CORE	3	3

Course Objective
- To provide in depth programming knowledge in MYSQL

Course Outcomes and Cognitive Level Mapping

COs	CO STATEMENTS On the successful completion of the course, students will be able to	COGNITIVE LEVEL
CO1	Recall DDL and DML Commands	K1
CO2	Apply Arithmetic, Logical and Set operators	K3
CO3	Implement string operations	K3
CO4	Use Join operations in SQL Queries	K3
CO5	Create Bank Database	K5

Mapping of CO with PSO and PO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

List of Practical

1. Create a table and perform the following DDL operations
   a. Set the primary key
   b. Check Constraints
   c. Alter the structure of the table
   d. Drop the table

2. Create a table and perform the following DML operations
   a. Insert Values
   b. Update and Delete records based on constraints
   c. Display values using various forms of select clause

3. Perform Arithmetic, Logical and Set Operations

    a. Arithmetic Operators

    b. AND, OR, NOT Operators

    c. UNION, INTERSECTION, MINUS

4. JOIN and SUB Queries

5. Implement Grouping and Ordering Commands in a Table.

6. Develop MYSQL queries to implement String operations using % and "_"

    [Note: create necessary tables for the above questions (1 to 8) with required attributes]

7. Consider the following relations for a Banking enterprise database

    BRANCH (branch-name:string, branch-city:string, assets:real)

    ACCOUNT (accno:int, branch-name:string, balance:real)

    DEPOSITOR (customer-name:string, accno:int)

    CUSTOMER (customer-name: string, customer-street: string, customer-city:string)

    Perform the following operations:

    a. Create the above relations by properly specifying the primary keys and the Foreign keys

    b. Enter at least five tuples for each relation

    c. Find all the customers who have at least two accounts at the main branch

    d. Find all the customers who have an account at all the branches located in a specific city.

    e. Generate suitable reports

SemesterIII	Internal Marks:25			External Marks: 75	
COURSE CODE	**COURSE TITLE**		**CATEGORY**	**Hrs. /Week**	**CREDITS**
22UCA3AC4	**FINANCIAL ACCOUNTING**		**ALLIED**	**4**	**3**

Course Objective

➢ To equip the students with fundamental knowledge and acquire analytical skills on the accounting concepts.

Course Outcome and Cognitive Level Mapping

CO Number	COStatement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Define the basic concepts of Accounting	**K1**
CO2	Explain the accounting rules required for business enterprise	**K2**
CO3	Make use of accounting concepts to interpret the performance of business	**K3**
CO4	Analyze the financial statement of the firm	**K4**

Mapping of CO with PO and PSO

COs/ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	2	3	3	2
CO3	3	3	3	3	2	3	2	3	3	2
CO4	2	3	3	3	3	3	2	3	3	2
CO5	2	3	3	3	3	3	2	3	3	2

"1"–Slight(Low)Correlation¬   "2"–Moderate(Medium)Correlation¬
"3"–Substantial (High)Correlation¬   "-"indicate there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Accounting Meaning – Definition of Accounting – Need for Accounting – Meaning of Book Keeping – Book Keeping Vs Accounting- Accounting Principles – Accounting Cycle –Accounting Equation. Double Entry: Meaning – Nature and Principle of Double Entry. Journal: Meaning and Need – Steps in Journalizing – Exercises of Journal Entry.	12	CO1, CO2, CO3, CO4	K1,K2, K3,K4
II	Ledger: Meaning – Utility – Format – Posting – Balancing an Account – Preparation of Trial Balance – TotalMethod – Balance Method - Comprehensive Problems on Journal, Ledger and Trial Balance	12	CO1, CO2, CO3, CO4	K1,K2, K3,K4
III	Subsidiary Books – Meaning – Cash Book – Simple cash book – Two Column cash book with Bank and Discount Columns – Three Column cash book – Petty Cash Book – Imprest System – Analytical petty cash book- Problems on Triple Column Cash Book and Petty cash book	12	CO1, CO2, CO3, CO4	K1,K2, K3,K4
IV	Pass Book – need for Bank Reconciliation statement – Methods of Preparation of Bank Reconciliation Statement – Favorable and Unfavorable Balances – Problems on BRS Depreciation – Meaning – Straight Line Method, Diminishing Balance Method and Annuity Method. (Simple Problems only)	12	CO1, CO2, CO3, CO4	K1,K2, K3,K4
V	Meaning – Need for Preparation – Components of Final Accounts – Trading Account – Profit and Loss Account – Balance sheet – Adjustments – Problems with adjustments	12	CO1, CO2, CO3, CO4	K1,K2, K3,K4
IV	**Self Study for Enrichment (Not to be included for External Examination)** Distinction between Journal and Ledger – Objective of Preparing Trial Balance – Benefits of subsidiary book System – Causes for the differences between cash book and pass book- Differences Between Trial Balance and Balance sheet – Need for Providing Depreciation		CO1, CO2, CO3, CO4	K1,K2, K3,K4

Text Book

1. S.P.Jain and K.L.Narang (2016), Fundamentals of Accounting, Kalyani Publishers, 2017
2. T.S. Reddy& Murthy (2020), Financial Accounting, Margham Publications, 2017

Reference Books

1. Dalston L. Cecil and Jenitra L.Merwin. (2015). Business Accounting. 4th Edition, Learn Tech Publishers.
2. R.L. Gupta & Radhaswamy M. (2018). Financial Accounting. 8th Edition, Sultan Chand Sons
3. Shukla & Grewal. (2018). Advanced Accountancy. Sultan Chand Sons.

Web Reference

1. www.accountingcoach.com
2. www.accountingstudyguide.com
3. www.futureaccountant.com
4. www.onlinelibrary.wiley.com

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms. G. Kanagavalli

Semester III	Internal Marks:40		External Marks: 60		
COURSE CODE	COURSE TITLE		CATEGORY	Hrs. / Week	CREDITS
22UCA3AC5P	COMPUTER APPLICATIONS IN BUSINESS (P)		ALLIED	4	3

Course Objective

➢ The primary objective of this course is to expose the students with the Accounting Software Tally ERP9 with GST

Course Outcome and Cognitive Level Mapping

CO Number	COStatement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recall the basic concepts of components of computer	K1
CO2	Understand the basic features of Tally ERP 9	K2
CO3	Prepare different types of financial reports	K3
CO4	Analyse stock group, stock category, stock item and compare stock category summary with godown summary.	K4
CO5	Explain the procedure for GST Registration and Bank Reconciliation Statement.	K5

Mapping of CO with PO and PSO

COs/ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2	3	2	3	3	2
CO2	3	3	3	3	2	3	2	3	3	2
CO3	3	3	3	3	3	3	2	3	3	2
CO4	3	3	3	3	2	3	2	3	3	2
CO5	3	3	3	3	3	3	2	3	3	2

"1"–Slight (Low) Correlation¬   "2"– Moderate (Medium) Correlation¬

"3"–Substantial (High) Correlation¬   "-"indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction to computerized Accounting – Features – Advantages –Manual Accounting Vs .Computerized Accounting – Accounting transaction.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
II	Introduction to Tally ERP 9 – Features of Tally – Creation of Company – Selecting a Company – Altering / Modifying existing company – Configuration of Tally – Tally screen and Menu – Accounting Features – Accounting Groups – User defined groups – Ledger creation, alteration and deletion	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
III	Accounting vouchers – inventory vouchers – invoicing – optional & non-accounting voucher – order processing – advanced voucher entry.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
IV	Introduction to Cost – Creation of cost Categories – Creation of Cost Centre– Editing – Deleting – Usage of Cost Category and Cost Centres in voucher entry – Inventory Information: Stock Groups – Stock Categories – Godowns – Unit Of Measure – Stock Items – Purchase orders and Sales orders processing – Recording Transactions using Orders.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
V	Goods and Service Tax (GST): GST Concepts – Enabling GST – Configuring Master with GST Details – GST Reports – Bank Reconciliation Statement	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
IV	**Self-Study for Enrichment** **(Not to be included for End Semester Examination)** Journal Entry – Ledgers – Trial Balance – Balance, Adjustments	-	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5

LIST OF PRACTICALS:

1. Creation, alteration and deletion of companies and user defined accounting groups.

2. Creation, alteration and deletion of ledger Accounts.

3. Preparation of Final Accounts with adjustments.

4. Voucher entries in double entry mode.

5. Creation, alteration and deletion of inventory masters.

6. Creation of Inventory Reports

7. Creation of Bank Reconciliation Statement

8. Creation of GST Registration

Text Book

1. V. SrinivasaVallabhan (2014). *Computer Applications in Business*, Sultan Chand & Sons
2. A.K. Nadhani(2015), Computer ApplicationbyImplementing Tally ERP, BPB Publications,Chennai.

Reference Books

1. Asok K. Nadhani, "TALLY ERP 9 TRAINING GUIDE - 4TH REVISED & UPDATED EDITION", January 2018.
2. Official guide to financial accounting using TALLY ERP 9 with GST, Tally Education P. Ltd.
3. Chadwick, L, "The Essence of Financial Accounting", PHI, 2nd Edition.

Web Reference

https://www.youtube.com/watch?v=s-r7hNyfuJs

Pedagogy

Lecture and Lab demonstration

Course Designer

Ms. S. Praveena

Semester III	Internal Mark:40		External Mark: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
22UCA3GEC1P	**ANIMATION TOOLS - I (P)**	**GEC**	**2**	**2**

Course Objective
- To impact training on Animation Tools

Course Outcomes and Cognitive Level Mapping

COs	CO STATEMENTS On the successful completion of the course, students will be able to	COGNITIVE LEVEL
CO1	Recall pen, and brush tools in Photoshop	K1
CO2	Apply resolution, grayscale, black and white to an image	K3
CO3	Using layers, rotation, overlapping of an image	K3
CO4	Creating custom colours, gradients, grouping of an image	K5
CO5	Develop an image by applying masks and filters	K5

Mapping of CO with PSO and PO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

List of Practical

1. THE WORKING PLACE (Installing Photoshop & Learning its interface)

2. TOOLS

   ⊔ Basic Tools

   ⊔ Selection Tools

   ⊔ Drawing and Coloring Tools

   ⊔ Advanced Tools

   ⊔ Text Tools

   ⊔ Tools Presets

3. USING BRUSH & PAINT

   ⊔ Brush Presets, Colors & Shapes

   ⊔ Create a multicolor real-life image using the brush tool.

4. WORKING WITH SELECTION

- ☐ Making Selections with Different
- ☐ ToolsModifying an Existing
- ☐ Selection Saving and Loading
  Selections

5. IMAGE SIZE, RESOLUTION, AND COLOR CHANGE
   - ☐ Changing the size, resolution, and gray scale of an
   - ☐ image.Convert black and white images into color
     image.

6. IMAGE MODIFICATION
   - Cropping, rotating, overlapping, and superimposing an image.

7. COMMERCIAL BROCHURE
   - Develop a commercial brochure with background tints.

8. LAYERS
   - Working with layers (creation, deletion, merge).

9. FILTERS AND MASKS
   - Applying masks and filtering on images.

10. PLAYING WITH PALETTES
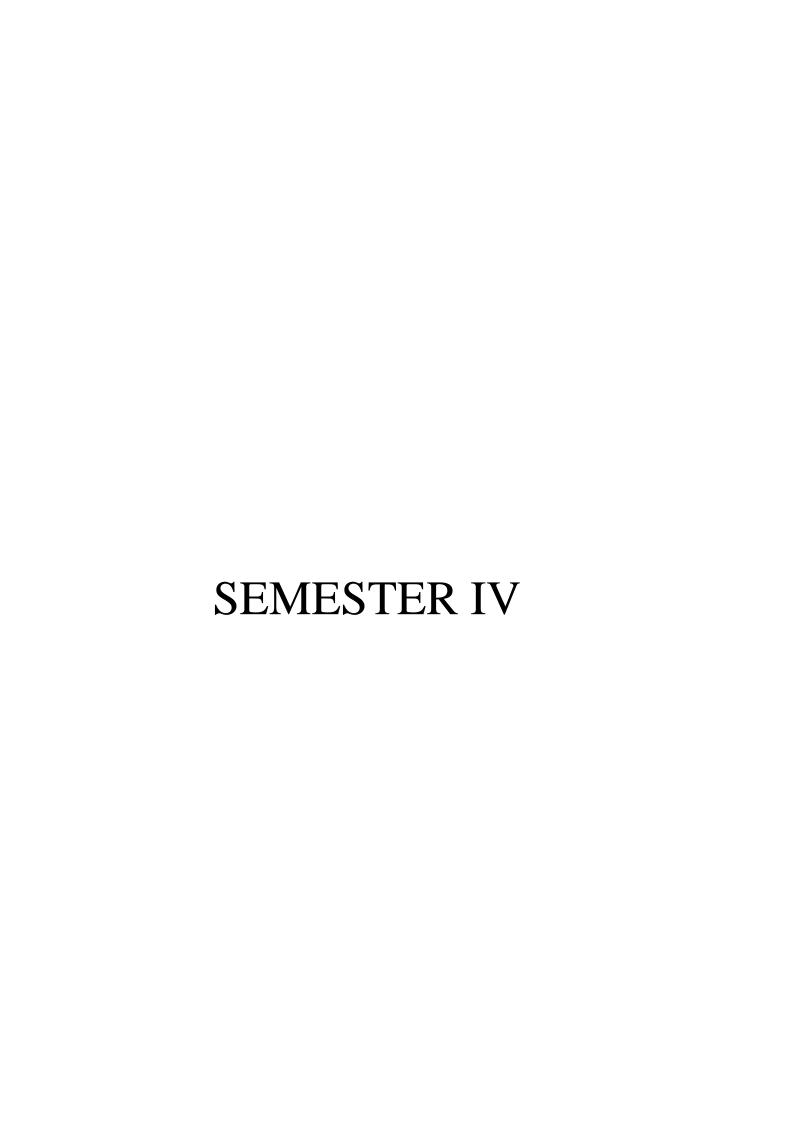   - Arranging Workspace
    - Various Palettes

Web References
- https://helpx.adobe.com/in/photoshop/tutorials.html
- https://www.javatpoint.com/photoshop
- https://www.photoshopessentials.com/basics/

Pedagogy

Demonstration, Powerpoint Presentation

Course Designer

Ms. M. Ellakkiya, Assistant Professor, Department of Computer Applications.

SEMESTER IV

Semester IV	Internal Marks:25			External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**	
22UCA4CC5	**Programming in Python**	**CORE**	**6**	**6**	

Course Objectives

- To make students understand the concepts of Python programming
- To impart knowledge on demand and supply concepts
- To design and program Python applications

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Outline the basic syntax and semantics of python programming language	K1
CO2	Summarize the problem-solving approach using python statements	K2
CO3	Build the python program using modules	K3
CO4	Examine the python programming concepts to develop programs	K4
CO5	Develop a python program to solve real-time problems	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"- Slight (Low) Correlation   "2"- Moderate (Medium) Correlation

"3" –Substantial (High) Correlation   "-" - Indicates there Is no Correlation

Syllabus

UNIT	Contents	HOURS	COs	COGNITIVE LEVEL
I	**Basics of Python Programming**: Python Character Set-Token-Python Core Data Type-The print() Function-Assigning Value to a Variable-Multiple Assignments-Writing Simple Programs in Python-The input() Function- The eval() Function- Formatting Number and Strings-Python In built Functions	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Operators and Expressions:** Introduction-Operators and Expressions-Arithmetic Operators-Operator Precedence and Associativity-Bitwise Operator. **Decision Statements:** Introduction-Boolean Type-Boolean Operators-Decision Making Statements-Conditional Expressions.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Loop Control Statements:** Introduction-The while Loop-The range() Function-The for Loop-Nested Loops-The break Statement-The continue Statement. **Functions:** Introduction-Syntax and Basics of a Function-Use of a Function-Parameters and Arguments in a Function-The Local and Global Scope of a Variable-The **return** Statement-Recursive Functions.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Strings:** Introduction-The str class- Basic Inbuilt Python Functions for String- The index[] Operator-Traversing String with for and while Loop-Immutable Strings-The String Operators-String Operations. **Lists:** Introduction-Creating Lists-Accessing the Elements of a List-Negative List Indices-List Slicing [Start : end]- Python Inbuilt Functions for Lists-The List Operator-List Methods-List and Strings-Splitting a String in List- Passing List to a Function-Returning List from a Function	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Tuples, Sets and Dictionaries:** Introduction to Tuples-Sets-Dictionaries. **File Handling:** Introduction-Need of File Handling-Text Input and Output- The seek() Function-Binary Files.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment (Not to be included for End Semester Examination)** Changing Precedence and Associativity- The Compound Assignment Operator-Using Numbers with Boolean Operators-Using String with Boolean Operators-The Lambda Function- List Slicing with Step Size	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

1. Ashok Namdev Kamthane (2018). Programming and problem solving with Python, McGraw Hill Education(India) Private Limited.

References

1. VamsiKurama (2018). Python Programming: A Modern Approach, Pearson Education.

2. Reema Thareja (2017). Python Programming using Problem Solving Approach, Oxford University

3. Mark Lutz (2013). Learning Python, 5th Edition, Orielly.

4. Adam Stewarts (2017). Python Programming, Create Space Independent Publishing Platform

neth A. Lambert, Fundamentals of Python – First Programs (2019). CENGAGE Publication.

Web References

1. https://www.programiz.com/python-programming

2. https://www.guru99.com/python-tutorials.html

3. https://www.w3schools.com/python/python_intro.asp

4. https://www.geeksforgeeks.org/python-programming-language/

5. https://en.wikipedia.org/wiki/Python_(programming_language)

Pedagogy

Chalk & Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr.K.Akila, Associate Professor, Department of Computer Applications.

Semester IV	Internal Marks:40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
22UCA4CC4P	Programming in Python (P)	CORE	4	4

Course Objectives

- Be able to design programs using math functions and numbers
- Be able to create loops and decision statements in Python.
- Be able to work with functions and pass arguments in Python.
- Be able to read and write files in Python.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recognize the syntax and semantics of Python	K1
CO2	Identify suitable techniques to construct a Python program.	K2
CO3	Implement the concepts of numbers, math functions and string functions in Python	K3
CO4	Analyze the logical structures which are used to the real-time applications.	K4
CO5	Develop a real-time application using Python programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"-Slight(Low)Correlation   "2"-Moderate(Medium)Correlation

"3" -Substantial(High)Correlation   "-"- Indicates there Is no Correlation

List of Practical

1. Program using variables, constants, I/O statements in Python.
2. Program using In-built Math functions.
3. Program using Operators in Python.

4. Program using Conditional Statements.
5. Program using Loops.
6. Program using Jump Statements.
7. Program using Functions.
8. Program using Recursion.
9. Program using Strings.
10. Program using Lists.
11. Program using Tuples.
12. Program using Dictionaries.
13. Program using Set Operations.
14. Program for File Handling.

Web References

1 https://www.programiz.com/python-programming

2 https://www.guru99.com/python-tutorials.html

3 https://www.w3schools.com/python/python_intro.asp

4 https://www.geeksforgeeks.org/python-programming-language/

5 https://en.wikipedia.org/wiki/Python_(programming_language)

Pedagogy

PowerPoint Presentation, Discussion and Practical Sessions.

Course Designer

Dr.K.Akila, Associate Professor, Department of Computer Applications.

Semester IV	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs / Week**	**Credits**
22UCA4AC6	BUSINESS COMMUNICATION	ALLIED	4	3

Course Objectives

- To provide an overview of prerequisites to Business Communication.
- To impart the correct practices of the strategies of Effective Business writing.
- To acquire good communication skills requisite for business correspondence and reporting.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Select the appropriate organizational formats, channels used in developing and presenting business messages.	**K1**
CO2	Explain the modern communication used in the business.	**K2**
CO3	Summarize the process of report writing and develop the interview techniques.	**K2, K3**
CO4	Identify ethical, legal, cultural and global issues affecting business communication.	**K3**
CO5	Analyse the situation of writing various types of letters.	**K4**

Mapping of CO with PO and PSO

COs/ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	2	3	3	3	3	2
CO2	3	3	3	3	2	2	2	3	3	2
CO3	3	3	3	3	2	3	2	2	3	2
CO4	3	3	2	3	3	3	2	2	3	2
CO5	3	3	3	3	2	2	2	2	3	2

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3"–Substantial (High) Correlation   "-"Indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Communication – Needs – Objectives – Communication Media – Process – Characteristics – Barriers of Communication – Steps to overcome barriers of Communication.	12	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4
II	Business letter – Needs – Function – Kinds of Business letter – Essentials of an Effective Business letter – Structure of Business letter – Letter of Enquiries and replies.	12	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4
III	Application letter – Preparation of Resume – Interview Meaning – Objective and Interview Techniques – Interviewee's Preparation for the Interview and Conduct during the Interview.	12	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4
IV	Modern forms of Communication – Email Mechanics of an e-mail – Layout of e-mail Teleconference , voicemail – Internet – multimedia Teleconferencing – Mobile Phone – SMS – Telephone Answering machine.	12	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4
V	Reports – Introduction – Types – Preparation – Structure and Organization of reports – Reports by individuals and committees press releases.	12	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4,K5
VI	**Self-Study for Enrichment (Not to be included for External Examination)** Circular letters – Objectives – Situations that need Circular letters – Sales letters – Bank Correspondence.	-	CO1,CO2, CO3,CO4, CO5	K1, K2, K3,K4

Text Books

1. Rajendra Pal , J.S. Korlahalli (2015). *Essentials of Business Communication*. Reprint. Sultan Chand & Sons.
2. Sharma R. C, Krishna Mohan (2017). *Business Correspondence and Report Writing* . 6th EditionTata Mc-Graw Hill.
3. Subba Rao .P (2013). *Business Communication*. Reprint. Cengage Learning India..

Reference Books

1. Krishnamacharyulu, Lalitha. R (2018). *Business communication*. 3rd Edition. Himalaya Publishing House.
2. Mathur S. P (2017). *Business Communication*. 2nd Edition.New Age International Publishers.

3. Sundar K, Kumara Raj .A (2019). *Essentials of Business Communication*. Reprint. Vijay Nicole Imprints Private Limited.

Web Reference

1. https://www.marketingtutor.net/communication-media-definition-types-examples/
2. https://www.vedantu.com/commerce/essential-qualities-of-a-good-business-letter
3. https://www.themuse.com/advice/the-ultimate-interview-guide-30-prep-tips-for-job-interview-success
4. https://www.yourarticlelibrary.com/business-communication/modern-forms-of-communication-fax-email-and-videoconferencing/27654
5. https://www.eapfoundation.com/writing/reports/structure/

Pedagogy

Lecture, Power Point Presentation, Group discussion, Seminar and Assignment.

Course Designer

Mrs. D. Indumathi.

Semester IV	Internal Marks: 40			External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**		**HRS/WEEK**	**CREDITS**
22UCA4GEC2P	**Animation Tools-II (P)**	**GEC**		**2**	**2**

Course Objective

- To impact training on Tools in Flash

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, students will be able to	Cognitive Level
CO1	Learn the basic concepts of animation as an art.	K1
CO2	Apply different types of tools	K3
CO3	Use trace and mask in image	K3
CO4	Create shape & motion tweening	K4
CO5	Develop 2D animations	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	2	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

List of Practical

1. Basics of Flash
2. Types of Tools
3. Trace a Character in Flash
4. Working with Masking
5. Create Animation using Text
6. Demonstrate Shape & Motion Tween
7. Develop a commercial brochure
8. Create a Snowfall Animation using Flash

Web References

1. https://helpx.adobe.com/in/flash/tutorials.html

2. https://www.geeksforgeeks.org/flash/

Pedagogy

Power Point Presentation, Demonstration and Practical Sessions.

Course Designer

Ms. M. Ellakkiya, Assistant Professor, Department of Computer Applications.

Semester IV	Internal Marks:40			External Marks:60	
COURSE CODE	COURSE TITLE		CATEGORY	HRS/WEEK	CREDITS
22UCA4SEC1P	Documentation and Presentation Tools (P)		SEC	2	2

Course Objective

- To impact training on Multimedia Tools

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, students will be able to	Cognitive level
CO1	Creating documents using template in MS–word	K1
CO2	Demonstrate usage of slides in MS–Power point	K2
CO3	Creating slides with Multimedia tools	K3
CO4	Ability to understand the various kinds of tools.	K2
CO5	Develop e-content in power point by their own	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"–Slight (Low) Correlation   "2"–Moderate (Medium) Correlation

"3"–Substantial (High) Correlation   "-"- indicates there is no correlation

List of Practical

1. **Working with MS Word:**
   - Text Manipulation–Change the font type and style, alignment of text and underline the text
   - Prepare a document with Bullets, Footers and Headers
   - Prepare a document in newspaper format
   - Manipulation of Table–Creation, insertion, deletion (Columns and rows)
   - Create a Mark Sheet using table and find out total of all marks for each student
   - Prepare a Greeting Card: Picture insertion and alignment
   - Create a document using template

- Prepare a Letter

- Prepare a Biodata

- Mail Merge:- Prepare Convocation invitations to be sent to specific addresses in the data source.

2. **Creating Powerpoint Presentation**

Slide show presentation for a seminar chooses your own topics.

- Enter the text in outline view

- Create on – bulleted and bulleted body text

- Apply the appropriate text attributes

- Presentation using wizards -Usage of design templates: - Creation of a slide show presentation using different presentation template and different transition effect for each slide. Use different text attributes in each slide.

- Develop an e-content in power point using multimedia tools (10 slides)

Web References

1. https://support.microsoft.com › en-us › office › add-and
2. https://www.javatpoint.com › how-to-insert-picture-an.
3. https://www.javatpoint.com › excel-work-sheet-rows-c..

Pedagogy

Demonstration, Power point Presentation, Discussion and Practical Session.

Course Designer

Dr. T. Julie Mary, Assistant Professor, Department of Computer Applications.

SEMESTER V

Semester V	Internal Marks:25			External Marks:75
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22UCA5CC6	**Programming in PHP**	**CORE**	**6**	**6**

Course Objectives

- To understand the fundamentals of web programming for design a web page using PHP.

- The students shall be able to develop a simple webpage using PHP with MySQL.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Outline the basic concepts in PHP Programming	K1
CO2	Describe the logical structure of PHP Programming	K2
CO3	Construct the web page using PHP Programming	K3
CO4	Analyze the PHP Programming concepts to develop Website	K4
CO5	Develop a real-time website using PHP Programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	2
CO3	3	2	3	3	3	3	3	3	2	2
CO4	3	2	2	2	2	3	3	2	2	2
CO5	3	2	2	2	2	3	3	2	2	2

"1"-Slight (Low) Correlation   "2"-Moderate (Medium) Correlation

"3"- Substantial (High) Correlation   "-"- Indicates there is no Correlation

Syllabus

UNIT	Contents	HOURS	COs	COGNITIVE LEVEL
I	**Essential PHP** Essential PHP: Creating your Development Environment - Creating a First PHP Page-Mixing HTML and PHP - Printing Some Text- Printing Some HTML- More Echo Power- Using PHP "Here" Documents - Adding Comments to PHP - Variables - Constants - Data Types, Operators and Flow Control.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4,K5
II	**PHP Basics** Strings and Arrays - Creating Functions- Reading Data in Web Pages: Setting Up Web Pages to Communicate with PHP - Handling Text Fields and Text Areas- Handling Check Boxes and Radio Buttons - Handling List Boxes, Password Controls, Hidden Controls, Image Maps, File Uploads and Buttons.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4,K5
III	**OOPS Concepts** Object-Oriented Programming: Creating Classes and Objects - Setting Access to Properties and Methods - Using Constructors and Destructors - Inheritance - Overriding, Overloading Methods, Autoloading Classes. Advanced Object-Oriented Programming: Creating Static Methods, Abstract Classes, Interfaces and Class Constants, Supporting Object Iteration - Using Final Keyword - Cloning Objects - Reflection.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4,K5
IV	**Browser-Handling, Session, Cookies and FTP** PHP Browser-Handling Power – Session, Cookies and FTP: Setting, Reading, Deleting Cookies - Working with FTP - Downloading, Uploading, and Deleting a File with FTP - Creating and Removing Directories with FTP - Working with E-mail- Storing Data and Writing a Hit Counter using Sessions.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4,K5
V	**File Handling and MySQL using PHP** File Handling - Working with Databases: Accessing the Database in PHP -Update Data into the Database- Insert Data into the Database - Delete Data from Database.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4,K5
VI	**Self-Study for Enrichment (Not to be included for End Semester Examination)** History of PHP – Getting PHP – PHP's Internal Data Types –Working with Database: What is Database? – Some Essential SQL – Creating a MySQL Database and Table – Putting data into the New Database.	-	CO1, CO2, CO3, CO4,CO5	K1, K2, K3, K4,K5

Textbook

1. Steven Holzner. (2012), The Complete Reference PHP, Tata McGraw Hill Pvt. Ltd.

References

1. Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre. (2013), Programming PHP, 3rdEdition, O'Reilly.

2. Luke Welling, Laura Thomson. (2017), PHP and MySQL Web Development, 5thEdition, Pearson India Education Services Pvt. Ltd.

Web References
1. https://www.phptutorial.net/
2. https://www.javatpoint.com/php-tutorial
3. https://www.w3schools.com/php/
4. https://www.geeksforgeeks.org/php-examples/
5. https://www.tutorialspoint.com/php/index.htm

Pedagogy

Chalk &Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms. V. Yasodha, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks:40			External Marks:60	
COURSECODE	**COURSE TITLE**		**CATEGORY**	**HRS/WEEK**	**CREDITS**
22UCA5CC5P	**PHP with MySQL (P)**		**CORE**	**4**	**4**

Course Objectives

- To inculcate the PHP web programming knowledge
- To create a basic knowledge about developing web page.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recall the syntax and semantics of PHP.	K1
CO2	Identify suitable techniques to construct a web page.	K2
CO3	Implement the PHP concepts to develop a website	K3
CO4	Analyze the logical structures which are used to the real-time applications.	K4
CO5	Develop a real-time application using PHP programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	2
CO3	3	2	3	3	3	3	3	3	2	2
CO4	3	2	2	2	2	3	3	2	2	2
CO5	3	2	2	2	2	3	3	2	2	2

"1"-Slight (Low) Correlation   "2"-Moderate (Medium) Correlation
"3"- Substantial (High) Correlation   "-"- Indicates there is no Correlation

List of Practical

1. Basic HTML tags.
2. get() and post() methods.
3. Validation.
4. String Handling functions.
5. Arrays.
6. COOKIES.
7. SESSIONS.
8. FILE Handling.
9. Database Connection.

Web References

1. https://www.phptutorial.net/

2. https://www.javatpoint.com/php-tutorial

3. https://www.w3schools.com/php/

4. https://www.geeksforgeeks.org/php-examples/

5. https://www.tutorialspoint.com/php/index.htm

Pedagogy

PowerPoint Presentations, Demonstrations and Practical Sessions.

Course Designer

Ms. V. Yasodha, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks: 25			External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**	
22UCA5CC7	**Software Engineering**	**CORE**	**6**	**6**	

Course Objectives

- To make the students to understand basics of software engineering
- To provide knowledge in various phases of Software Engineering Process
- To apply object-oriented analysis and design concepts

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, students will be able to	Cognitive Level
CO1	Describe the basics of Software Engineering	K1
CO2	Summarize the design models	K2
CO3	Explain object-oriented analysis and design concepts	K4
CO4	Demonstrate the coding of a software	K3
CO5	Evaluate various software testing techniques	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	1	3	3	2	3	1
CO2	3	2	3	2	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	2	2	2	3	3	2	3	1
CO5	2	3	3	2	2	2	3	2	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

Syllabus

UNIT	Contents	HOURS	COs	COGNITIVE LEVEL
I	**Software Engineering-Introduction:** Introduction to Software Engineering -Software Process - Software Process Models -Software product. **Requirements Engineering Principles**: Introduction - Types of Requirements - Steps involved in Requirement Engineering.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

II	**Requirement Analysis Modeling**: Analysis Modeling Approaches - Structured Analysis - Object Oriented Analysis. **Design and Architectural Engineering**: Design Process and Concepts - Basic Issues in Software Design - Characteristics of Good Design - Software Design and Software Engineering - Modularity, Cohesion, Coupling, Layering - Real Time Software Design -Design Models	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Object Oriented Concepts:** Introduction - Fundamental Parts of Object-Oriented Approach - Data Hiding and Class Hierarchy Creation - Relationships - Design Patterns – Frameworks. **Object Oriented Analysis and Design**: Object Oriented Analysis - Object Oriented Design.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**User Interface Design:** Concepts of User Interface - Elements of User Interface -Designing the User Interface - User Interface Evaluation -Golden Rules of User Interface Design - User Interface Models – Usability. **Software Coding:** Introduction - Coding Conventions – Key Concepts in Software Coding.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Introduction to Software Testing**: Introduction - Software Testing Objectives - Types of Software Testing. **Software Maintenance:** Introduction - Maintenance Activities - Maintenance Process - Maintenance Cost - Software Evolution - Reverse Engineering - Re-engineering - Re-structuring - Maintenance Strategies - Issues in Software Maintenance.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment (Not to be included for End Semester Examination)** Requirements Engineering - Importance of Requirements - Function Oriented System vs Object Oriented System Models - Design Documentation - Role of UML in OO Design – Programming Principles – Programming Guidelines – Psychology of Testing – Software Testing Scope - Strategic Approach to Software Testing	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

1. Chandramouli Subramanian, Saikat Dutt, Chandramouli Seetharaman, B.G.Geetha, (2018). Software Engineering, Pearson Publications.

References

1. Jibitesh Mishra, (2011). Software Engineering, Pearson Education.

2. Richard E. Fairley, (2001). Software Engineering Concepts, Tata McGraw-Hill Publishing Company Ltd.

3. Roger S.Pressman, Bruce R.Maxim, (2014). Software Engineering: A Practitioner's Approach, Tata McGraw-Hill Publishing Company Ltd.

Web References

1. https://www.tutorialspoint.com/software_engineering/

2. https://www.geeksforgeeks.org/software-engineering/

3. https://www.slideshare.net/pashadon143/se-46394097/

Pedagogy

Chalk & Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms.A.Jabeen, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks : 25			External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY		HRS/WEEK	CREDITS
22UCA5CC8	Data Mining	CORE		5	5

Course Objectives

- To introduce the concept of data mining as an important tool for enterprise management
- To enable effective sources of data and process it for data mining
- Enhance all data mining algorithms and methods of evaluation

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, the students will be able to	Cognitive Level
CO1	Illustrate the fundamental concepts, benefits, and problem areas Associated with data mining.	K1
CO2	Elaborate different steps involved in the process of data preprocessing.	K2
CO3	Summarize various models of data warehousing and online analytical processing.	K3
CO4	Classify algorithm to predict accurately the target class of objects.	K4
CO5	Evaluate the working pattern of the cluster analysis algorithm.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	1	2	2	1	1	3	1
CO2	1	2	2	1	1	1	2	2	1	2
CO3	2	3	2	3	2	3	2	3	3	2
CO4	2	3	1	3	2	2	3	3	2	2
CO5	1	3	2	2	2	3	3	2	2	3

"1"–Slight (Low) Correlation   "2"– Moderate (Medium) Correlation
"3"–Substantial (High) Correlation   "-"-indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction:** Data Mining– Moving towards the Information Age-Data Mining the Evolution of Information Technology– Kinds of Data Can Be Mined – Kinds of Patterns Can Be Mined– Technologies–Applications– Major issues in Data Mining.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Data Preprocessing:** Data Preprocessing: An Overview – Data Cleaning – Data Integration-Entity Identification Problem - Redundancy & Correlation Analysis – Data Reduction – Data Transformation and Data Discretization–Data Transformation Strategies Overview	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Data Warehousing and Online Analytical Processing:** Data Warehouse: Basic Concepts – DataWarehouse Modeling-Data Cube and OLAP - **Data Cube: A Multidimensional Data Model Stars, Snowflakes, and Fact Constellations**: Schemas for Multidimensional Data Models - Typical OLAP Operations – Data Warehouse Design and Usage.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Mining Frequent Patterns, Associations, and Correlations**: **Basics Concepts and Methods**: Basic Concepts – Frequent Item set Mining Methods - Apriori Algorithm- Finding Frequent Item sets by Confined Candidate Generation - Generating Association Rules from Frequent Item sets - **Classification:** Basic Concepts: Basic Concepts–Decision Tree Induction- Decision Tree Induction–Attribute Selection Measures- Bayes Classification Methods	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Cluster Analysis**: Basic Concepts and Methods: Cluster Analysis-Partitioning Methods– k-means– Hierarchical Methods: Agglomerative versus Divisive Hierarchical Clustering – Distance Measures in Algorithmic Method–Outlier Detection: Outliers and Outlier Analysis – Outlier Detection Methods-**Data Mining Trends and Research Frontiers:** Data Mining Applications.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment (Not included for End Semester Examinations)** Predictive analysis-it's working-Analytical techniques-Area of Text mining-Text Mining process-Introduction to sentiment analysis- Types of sentiment analysis-Rule Based Classification	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

1. Jiawei Han and Micheline Kamber (2012). Data Mining Concepts and Techniques, Third Edition.

References

1. Margaret H.Dunham (2003).Data Mining: Introductory and Advanced Topics,Pearson Education.
2. Arun K.Pujari (2010).Data Mining Techniques, University Press.

Web References

1. www.tutorialspoint.com
2. https://www.techopedia.com/definition/15634/web-mining
3. https://www.expertsystem.com/data-mining-predictive-analytics-difference/
4. https://data-flair.training/blogs/text-mining/

Pedagogy

Chalk & Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr. T. Julie Mary, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks : 40		External Marks : 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UCA5DSE1AP	MATLAB (P)	DSE	5	4

Course Objective

- To develop programming skills and technique to solve mathematical problems

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify the logic for a given a problem	K1
CO2	Recognize the syntax and construction of MATLAB programming code	K2
CO3	Analyze the concepts various functions	K3
CO4	Interpret and visualize simple mathematical functions and operations	K4
CO5	Implement simple mathematical functions/equations in numerical computing environment	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	2	1	2	2
CO2	3	2	3	2	1	3	2	2	3	3
CO3	3	3	3	2	2	3	2	2	3	2
CO4	3	2	3	2	2	3	3	1	3	2
CO5	3	3	3	2	2	3	3	1	2	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

List of Practical
1. Arithmetic Operations

2. Complex Numbers

3. Control Flow

4. Array Indexing

5. Functions

6. Matrix Operations

7. Plotting

8. Image Processing

9. Mathematical Computing

10. Packages

Web References

1. https://www.math.unipd.it/~mrrusso/Didattica/NA-Yaounde/LAB1/Exercises1.pdf

2. https://engineeringservicelearning.ucmerced.edu/sites/engineeringservicelearning.ucmerced.edu/files/page/documents/lab1finalversionpdf.pdf

3. https://lo.unisa.edu.au/pluginfile.php/724774/mod_resource/content/1/MME_1_Practicals_guide_2013_02_25.pdf

Pedagogy

PowerPoint Presentation, Demonstration, Discussion and Practical Sessions.

Course Designer

Ms. A. Anandhavalli, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22UCA5DSE1BP	**Data Mining (P)**	**DSE**	**5**	**4**

Course Objective

- To impact training on data mining tasks with data mining toolkit-WEKA

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statements On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand how to perform data mining tasks using the WEKA Toolkit	K1
CO2	Recognize various kinds of implementation	K2
CO3	Demonstrate the Pre-processing, Classification, etc. in large data sets	K3
CO4	Ability to apply algorithms as a component to the existing tools	K3, K4
CO5	Implement simple mining techniques for realistic data.	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	2	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Practical

1. Data Exploration and Preprocessing

2. Classification

3. Performance Evaluation and other classifiers

4. Association Analysis

5. Clustering

6. Data Visualization

7. Knowledge Flow

8. Experimenter

9. Feature Selection

Web References

1. https://cobweb.cs.uga.edu/~khaled/DMcourse/Weka-Tutorial-Exercises.pdf

2. https://ppawar.github.io/Spring2020/CSE351-S20/Exercises/Weka%20activity%20-%201%20April%2020.pdf

3. https://uh.edu/~smiertsc/4397cis/Chapter_4_Using_WEKA.pdf

Pedagogy

PowerPoint Presentation, Demonstration, Discussion and Practical Sessions.

Course Designer

Ms. A. Anandhavalli, Assistant Professor, Department of Computer Applications.

Semester V	Internal Marks:40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
22UCA5DSE1CP	R Programming (P)	DSE	5	4

Course Objective
- To be able to perform operations using R Programming

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand and use R – Data Structures.	K2
CO2	Explain the basic functions to enhance the effective usage of R Programming	K2
CO3	Apply R programming and understand different data frames	K3
CO4	Organize R Programmeusing charts	K4
CO5	Analyze vector using R – programming capabilities	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"- Slight (Low) Correlation   "2"-Moderate (Medium) Correlation
"3" –Substantial (High) Correlation   "-" - Indicates there Is no Correlation

List of Practical
1. Create three vectors such as numeric data, character data and logical data. Display the content of the vectors and their type.
2. Create a simple bar plot of five subject marks of a student
3. Create a function to print squares of numbers in sequence.
4. Create data frames which contain details of 5 employees and display summary of the data.
5. Create an array of two 3x3 matrices for two given vectors.
6. Extract 3rd and 5th rows with 1st and 3rd columns from a given data frame.
7. Generate inner, outer, left, right join (merge) from given two data frames.
8. Demonstrate use of histogram.
9. Demonstrate box plot function.
10. Create pie plot using R.

Web References

1. https://www.jnec.org/labmanuals/it/te/sem1/R-lab.pdf

2. https://cdlsiet.ac.in/wp-content/uploads/2023/03/R-Language-Lab-Manual-lab-1.pdf

3. https://kottesandeep.blogspot.com/2022/03/r-programming-lab.html

Pedagogy

PowerPoint Presentation, Discussion, Demonstration and Practical Session.

Course Designer

Dr.Lakshna Arun, Associate Professor, Department of Computer Applications

Semester V	Internal Marks:40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
22UCA5SEC2P	Data Analytics Using Excel(P)	SEC	2	2

Course Objective
- To be able to perform operations using EXCEL

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Make use of the basic formatting and editing options	K3
CO2	Interpret the data using Conditional formatting options in Excel	K2
CO3	Explain the purpose of using functions in the workbook	K2
CO4	Organize the data using pivot tables & pivot charts in MS-Excel	K3
CO5	Build the basic Lookup functions to enhance the effective usage of excel functions in the workbook	K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"- Slight (Low) Correlation   "2"-Moderate (Medium) Correlation
"3" –Substantial (High) Correlation   "-" -Indicates there Is no Correlation

List of Practical

1. **Basic Commands in Excel**
   - Creating & Saving Work Books
   - Selecting Cells
   - Entering Text & Numbers into Cells
   - Naming The Cells
   - Insert Rows & Columns
   - Renaming Workbooks

- Move Or Copy Worksheets
- Auto Complete

2. Formatting & Filtering Using Excel

- Find & Replace
- Sort & Replace
- Data Validation
- Remove Duplicates
- Import Data from Different Resources
- Freeze Panes
- Mail Merge

3. Pivot Table & Chart

- Creating Pivot Tables and Pivot Charts
- Manipulating A Pivot Table
- Changing Calculated Value Fields
- Sorting & Filtering Pivot Table Data

4. Lookup Functions

- The Horizontal Lookup & Vertical Lookup Functions
- Using If,And & Or Functions
- Index,Match & Offsetting Functions

Web References

4. https://support.microsoft.com/en-us/office/analyze-data-in-excel-3223aab8-f543-4fda-85ed-76bb0295ffc4
5. https://www.youtube.com/watch?v=iG6lN9aBrcM
6. https://www.youtube.com/watch?v=GccwaO3NU0g

Pedagogy

PowerPoint Presentation, Discussion, Demonstration and Practical Session.

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