THIRUVALLUVAR UNIVERSITY
BACHELOR OF SCIENCE

B.Sc. INFORMATION SYSTEM MANAGEMENT

UNDER CBCS
(With effect from 2022 - 2023)

Programme Objectives: (5 Points Compulsory)

1. To provide knowledge in areas related to Information System Management and enable the graduates to design analytical and computational approaches for the societal and technological challenges
2. To prepare the graduates to have successful careers in areas related to Information System and drive technological growth
3. To design and deploy software solutions in order to meet the societal and industry needs
4. To prepare the graduates to be responsible citizen and contribute to the society with his expertise and technological innovation
5. To engage in independent and life long learning and recognize the need for providing solutions according to the technological changes

Programme Educational Objectives: (5 Points Compulsory)

1. To enrich knowledge in areas related to Information System Management and apply the assimilated knowledge in designing hardware and/ or software related applications for the industries
2. To provide in-depth knowledge to the graduates in areas related to Information System Management so that they are capable of creating novel products and solutions to meet the current industrial and societal requirements
3. To engage in Information System Management related profession and contribute ethically for the industrial and societal needs
4. To assimilate and use state of the art computing technologies and tools to develop systems or products for solving real world problems in order to contribute for the societal growth
5. To nourish the leadership qualities of graduates so that they can address real world issues in responsive, innovative and ethical manner

Programme Specific Outcomes: (10 Points Compulsory)

1. Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement.
2. Design and develop applications to analyze and solve all Information science related problems.
3. Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects.

4. Analyze and review literatures to invoke the research skills to design, interpret and make inferences from the resulting data.
5. Integrate and apply efficiently the contemporary IT tools to all computer applications.
6. Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations.
7. To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise.
8. To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms.
9. To enable graduates to have a successful career in industries associated with Computer Science or as entrepreneurs.
10. Improve the research culture while maintaining scientific integrity and objectivity

Programme Outcomes: (10 Points Compulsory)

On successful completion of B.Sc. Information System Management programme the students will be able to:

1. apply the knowledge of mathematics, science and information systems to the solution of complex scientific problems
2. gather and use state of the art computing technologies and tools necessary for information system management practices
3. design a system or product to meet the real world problems related to social, economic and environmental contexts
4. utilize the knowledge and methods related to information system management to provide valid solutions
5. communicate effectively about the complex computing activities by preparing effective reports, documentation and presentation
6. utilize modern methodologies, skills, and technologies required for integrated solutions and manage projects and function effectively in a team
7. identify the need Recognize the need for and life-long learning, engage in self-learning for continual development as a computing professional for the betterment of the society
8. apply ethical principles and commit to professional responsibilities and human values
9. understand the impact of computing solutions in a global and societal context with the help of the gained knowledge
10. innovate and contribute value and wealth for the benefit of the society

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components Course Title		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		SEMESTER I					**CIA**	**Uni. Exam**	**Total**
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	**Communicative English I**	25	75	100
3.	III	Core Theory	Paper-1	6	4	Introduction to Information Technology	25	75	100
	III	Core Practical	Practical-1	4	0		0	0	0
4.	III	Allied -1	Paper-1	4	3	(**to choose any 1 out of 2)** **1.** Mathematical Foundations **2.** Financial Accounting I	25	75	100
	III	Allied- 1	Practical-1	2	0		0	0	0
5.	**III**	**PE**	**Paper 1**	**6**	**3**	**Professional English II**	**25**	**75**	**100**
6.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		**36**	**20**		**150**	**450**	**600**
		SEMESTER II					**CIA**	**Uni. Exam**	**Total**
7.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
8.	II	English (CE)	Paper-2	6	4	**Communicative English II**	25	75	100
9.	III	Core Theory	Paper-2	5	4	Business Accounting Software	25	75	100
10.	III	Core Practical	Practical-1	3	2	Office Automation Lab	25	75	100
11.	III	Allied-1	Paper-2	4	3	(**to choose any 1 out of 2)** 1. Statistics 2. Financial Accounting I	25	75	100
12.	III	Allied Practical - 1	Practical-1	2	2	(**to choose any 1 out of 2)** 1. Mathematical Foundation & Statistics Lab 2. Tally Lab	25	75	100

13.	**III**	**PE**	**Paper 1**	**6**	**3**	**Professional English II**	25	75	100
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		Sem. Total		**36**	**25**		**225**	**675**	**900**
		SEMESTER III					**CIA**	**Uni. Exam**	**Total**
16.	I	Language	Paper-3	6	4	Tamil/Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	3	3	Programming in C	25	75	100
19.	III	Core Practical	Practical-2	3	2	Programming in C Lab	25	75	100
20.	III	Allied -2	Paper-3	4	3	**(to choose any 1 out of 2)** A. Web Designing B. Business Communication	25	75	100
	III	Allied	Practical	3	-	A. Web Designing Lab B. Business Communication Lab	0	0	0
21.	IV	Skill Based Elective	Paper-1	3	2	E-Business	25	75	100
22.	IV	Non-Major Elective	Paper-1	2	2	Introduction to Industry 4.0	25	75	100
		Sem. Total		**30**	**20**		**175**	**525**	**700**
		SEMESTER IV					**CIA**	**Uni. Exam**	**Total**
23.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
24.	II	English	Paper-4	6	4	English	25	75	100
25.	III	Core Theory	Paper-4	3	3	Java Programming	25	75	100
26.	III	Core Practical	Practical-3	3	2	Java Programming Lab	25	75	100

27.	III	Allied-2	Paper-4	4	3	**(to choose any 1 out of 2)** A. Operations Research B. Cost and Management Accounting	25	75	100
28.	III	Allied Practical	Practical-2	3	2	A. Operations Research Lab **B.** B. Business Communication & Cost and Management Accounting Lab	25	75	100
29.	IV	Skill Based Elective	Paper-2	3	2	Computer Networks	25	75	100
30.	IV	Non-Major Elective	Paper-2	2	2	Management Information System	25	75	100
				30	**22**		**200**	**600**	**800**
		SEMESTER V					**CIA**	**Uni. Exam**	**Total**
31.	III	Core Theory	Paper-5	6	5	Principles of Management	25	75	100
32.	III	Core Theory	Paper-6	6	5	Data Base Management System	25	75	100
33.	III	Core Theory	Paper-7	6	4	Python Programming	25	75	100
34.	III	Core Practical	Practical-4	3	2	Python Programming Lab	25	75	100
35.	III	Core Practical	Practical-5	3	2	DBMS LAB	25	75	100
36.	III	Internal Elective	Paper-1	3	3	**(to choose any 1 out of 3)** A. **Enterprise Resource Planning** **B. Bioinformatics** C. Marketing Management	25	75	100
37.	IV	Skill Based Elective	Paper-3	3	2	Entrepreneurial Development	25	75	100
		Sem. Total		**30**	**23**		**175**	**525**	**700**

		SEMESTER VI					CIA	Uni. Exam	Total
38.	III	Core Theory	Paper-8	4	4	Computer Graphics and Web Designing	25	75	100
39.	III	Core Theory	Paper-9	4	4	Software Engineering	25	75	100
40.	III	Core Theory	Paper-10	4	4	Multimedia	25	75	100
41.	III	Core Practical	Practical-6	2	2	Computer Graphics and Web Designing Lab	25	75	100
42.	III	Core Practical	Practical-7	2	2	**Multimedia Lab**	25	75	100
43.	III	Core Project	Paper - 11	5	5	Individual / Group Project	25	75	100
44.	III	Internal Elective	Paper-2	3	3	**(to choose any 1 out of 3)** A. Data Analytics with R Management B. Fundamentals of Biological Sciences **C. Operating Systems**	25	75	100
45.	III	Internal Elective	Paper-3	3	3	**(to choose any 1 out of 5)** A. INDUSTRY 4.0 – ARTIFICIAL INTELLIGENCE B. INDUSTRY 4.0 – BIG DATA APPLICATIONS C. INDUSTRY 4.0 – AUGMENTED REALITY D. Human Resource Management E. Information Security	25	75	100
46.	IV	Skill Based Elective	Paper-4	3	2	Business Ethics	25	75	100

47.	V	Extension Activities		0	1		100	-	100
		Sem. Total		**30**	**30**		**325**	**675**	**1000**
					140				**4700**

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	3	10	100	200
	Allied Practical	2	2		100	200
	Electives	3	3	9	100	300
	Core	10	(3-5)	40	100	1000
	Core practical	7	(2-3)	14	100	700
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based subject	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	**47**		**140**		**4700**

SEMESTER I

PAPER – 1

COURSE OBJECTIVES:

- Introduction to IT, Computers
- An explanation of input and output devices and types of software.
- To learn about networks and its types
- To make them understand the importance of internet and its applications
- Get a better understanding of operating system and its types.

INTRODUCTION TO INFORMATION TECHNOLOGY

UNIT - I

Basics of Information Technology: Definition - Information Technology for Business - Technological Trends in IT - Applications of Information Technology - Information technology law - **Introduction to Computers**: Definition - Characteristics of a Computer - Classification of Computers - Basic Anatomy of the Computer - Applications / Uses of Computers in different fields

UNIT – II

Input and Output Devices: Input Devices - Output Devices - Data Representation - Programming Languages / Computer Languages - **Software**: System Software - Application Software - Difference between System Software and Application Software - Device Drivers - Computer Viruses, Bombs, Worms - Types of Viruses

UNIT – III

Data Communication and Computer Networks: Data Communication - Computer Network - The Uses of a Network - Types of Networks: LAN, MAN, WAN - -Intranet and Extranet - Network Topologies- Transmission Media: Guided Transmission Media - Wireless Transmission

UNIT – IV

Internet and its Applications : History of Internet - Uses of Internet / Application of Internet- Advantages of Internet - ISP - Internet Services - IP Address - Web Browser - URL - DNS - Internet Explorer - Types of internet connections - E-mail - Search Engine

UNIT – V

Operating System: Evolution of operating systems - Function of Operating System - Classification of Operating –System - Example of Operating System – DOS –Windows – UNIX - Linux -

Difference between Windows and DOS- Difference between Linux and Windows.

TEXT BOOKS:

1. Introduction to Information Technology PelinAksoy, Laura DeNardis, Cengage Learning India PrivateLimited.
2. Alexis Leon and Mathews Leon, “Fundamentals of Information Technology”,Vikas Publishing House Pvt.Ltd.
3. Dr.P.Rizwan Ahmed, Introduction to Information Technology, Second Edition (2016), Margham Publications,Chennai.

WEB REFERENCES:

1. https://www.sophia.org/tutorials/basic-introduction-to-information-technology
2. http://iiscs.wssu.edu/drupal/node/4327
3. http://www4.comp.polyu.edu.hk/~csajaykr/comp5131.html
4. https://www.hfcc.edu/catalog/courses/cis-100

ALLIED - 1 PAPER-1

A. MATHEMATICALFOUNDATIONS

UNIT – I: SYMBOLICLOGIC

Proposition, Logical Operations, Conjunction, disjunction, negation, conditional and bi-conditional operators, Converse, Inverse, Contra positive, logically equivalent, tautology and contradiction.

UNIT – II

Sets, Set Operations, Venn diagram, Properties of Sets, Number of Elements in a Set, Cartesian product.

UNIT – III

Multiplication of Matrices, Singular and Non-Singular Matrices, Ad joint of a Matrix, Inverse of a Matrix symmetric and skew-symmetric, Hermitian and skew- Hermitian, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by Cramer's rule.

UNIT – IV: MATRICES (Cond)

Test for Consistency and Inconsistency of linear equations, [Rank Method], Characteristic roots and characteristic Vectors, Cayley – Hamilton theorem.

UNIT – V: NUMBER THEORY

Prime Number – Composite Number – Decomposition of a Composite Number as a Product of Primes Uniquely [without proof] – Divisors of Positive integer – Congruence Modulo n-Euler Function [without proof] – Highest power of a Prime Number p Contained inn!

Recommended Text:

1. P.R. Vittal – Mathematical – Margam Publication, (For units 1 to4).
2. P.R. Vittal Algebra, Analytical Geomentry and Trigonomentry (For unit 5) – Margam Publications.

REFERENCE BOOKS:

1. An Introduction to Symbolic Logic –SussaneKathrina Langer,1937
2. A Mathematical Introduction to Logic – HerbertEndettan,1972
3. Advanced Number Theory with Applications- Hardcover, Mollin ARichard

B. FINANCIAL ACCOUNTING – I

UNIT – I

Need, concepts and conventions – Accounting Equation – Rectification of errors – Bank Reconciliation Statement – Self balance ledgers.

UNIT – II

Depreciation, Reserves and Provisions – Depreciation, Depletion and Amortization – Objectives of Providing Depreciation – causes of depreciation – methods of recording depreciation – straight line method – Diminishing Balance Method – Changes in method – Insurance Policy Method – Machine Hour Rate Method – Depletion Method – Revaluation Method.

UNIT – III

Account current – Average Due date – Insurance Claim – Abnormal items – Loss of property and Stock – Average clause – Loss of Profit.

UNIT – IV

Final Accounts – Introduction – Manufacturing Account – Trading Account – Distinction between capital and Revenue expenditure – Profit and Loss Account – Balance Sheet – Various adjustments – Classification of Assets and Liabilities – Adjustments.

UNIT – V

Single Entry – Objectives – Definition – Salient features – Limitations of Single Entry – Ascertainment of Profit – Statement of Affairs Method – Conversion Method – Difference between statement of Affairs and Balance Sheet.

REFERENCE BOOKS:

1. M.C. Shukla, T.S. Grewal. Advanced Accounts (Volume – I) S.Chand& Co Ltd., NewDelhi.
2. T.S. Reddy&A.Murthy – Financial Accounting – Margahan Publications,Chennai.
3. R.S.N. Pillai, Bagawathi&S.Uma – Advanced Accounting (Financial Accounting) Volume I, S.Chand& Co Ltd., NewDelhi.
4. R.L.Gupta& V.K. Gupta, Financial Accounting , Sultan Chand & Sons, NewDelhi.
5. S.P.Jain& K.L. Naranj, Advanced Accountancy, KalayaniPublications , New Delhi, Ludhiana.

SEMESTER II

PAPER II BUSINESS ACCOUNTING SOFTWARE

UNIT I

Introduction to word- starting word - Creating short cut for word – creating word documents – creating business letters using wizards – editing word documents – inserting objects formatting documents – spelling and grammar check – word count – thesaurus auto correct working with tables – saving, opening and closing documents – mail merge.

UNIT II

Introduction to spread sheets – MS Excel and its features – what is on the screen - Building work sheets – entering data in work sheets, editing and formatting work sheets – creating and formatting different types of charts – application of financial and statistical function

UNIT III

Fundamentals of Computerized accounting – Computerized accounting Vs manual accounts. Architecture and customization of tally – Features of tally – Configuration of Tally screens and menus – Creation of company – Creating of groups – Editing and deleting groups - Caution of ledgers - Editing and deleting ledgers

UNIT IV

Introduction to vouchers – Vouchers entry payment voucher – Receipt voucher - Sales vouchers – Purchase vouchers – contra voucher - Journal vouchers – Editing and deleting vouchers. Introduction to Inventories – Creation of stock categories – Creation of Stock groups – Creation of Stock items – Configuration and features of stock item – Editing and deleting stocks

UNIT V

Introduction to cost – Creation of cost category – Creation cost centers- Editing and deleting cost centers & categories – Usage of cost category and cost centers in vouchers entry - Budgetary controls – Creation of budgets – Editing and deleting budgets – Generating and printing reports in detailed and condensed format. Day books – Balanced sheets – Trial balance – Profit and Loss Account –Found flow statement - Cost centre report – Inventory report Bank reconciliation statement

TEXT BOOKS:

1. Dr. S.V. SrinivsasaVallabhan -Computer Applications in Business – SultanChand Publication.

2. Dr.P.Rizwan Ahmed,[2016] Computer Application in Business Including Tally ERP9, Margham Publications,Chennai

REFERENCES:

1. Nandhani A K, Mastering Tally ERP.9, BPB Publications, NewDelhi.
2. Dinesh Maidasani, Mastering Tally ERP.9, Firewall Media, NewDelhi
3. Ashok K Nadhani, Tally ERP.9 Training Guide, BPB Publications NewDelhi
4. Wayne Winston, Microsoft Excel Data Analysis and Business Modeling, Microsoft Press, Fifth edition, 2016

WEB REFERENCES

1. www.tallyerp9help.com/
2. www.tallyschool.com/tally-erp-9-books/
3. www.tallychampsclub.com/Tally.ERP9_Book.aspx
4. www.tallyhelp.org/tallybook.html

CORE PRACTICAL – I

OFFICE AUTOMATION LAB

MS Word

1. Prepare a leave letter in Ms –word.
2. Create a News Paper format document in Ms – Word.
3. Prepare a calendar in Ms -Word.
4. Business Letter using Mail MergeConcept.
5. Prepare a Greeting card for New Year in Ms -Word.
6. Create an Advertisement using Bullets and Numbering in Ms –Word

MS- Excel

1. Prepare a Mark List for nstudents.
2. Arrange data in Ascendingorder
3. Arrange data in Descendingorder
4. Pay billPreparation
5. Preparing various types ofGraphs
6. EB billPreparation

Internet

1. Creation of E-mailID
2. Composing and SendingE-Mails'
3. Sending E- Mail with attachment
4. Downloading Files, Text, Pictures fromE-Mail.
5. Deleting mails.
6. Checking Spam and Box waitinglist.

REFERENCES:

1. M S Office – S SShrivatsava

ALLIED -1

PAPER – 2

A. STATISTICS

UNIT – I

Measure of Central Tendency – Mean, Median, Mode and their Merits and Demerits.

UNIT – II

Measure of Dispersion – Range, Mean Deviation, Quartile Deviation, Standard Deviation, Co-Efficient of Variation.

UNIT – III

Skewness – Karl Pearson's and Bowley's Co-Efficient of Skewness.

UNIT – IV

Correlation and regration

UNIT – V

Index Numbers – Moving averages 3-yearly, 4-yearly, 5-yearly weighted aggregate index laapey's Method Paaschy's method fishers ideal method Marshall Edge worth Method family budget method – Seasonal index method.

Recommended Text:

1. S.P. Gupta Statistical Methods – Sultan Chand &Sons.

REFERENCES:

1. Statistics for Management- by Richard l Levin , David SRubin
2. Complete Business Statistics by Amir D Aczel, JayavelSounderpandian

B. FINANCIAL ACCOUNTING – II

Objective

To gain knowledge of accounting in General, to understand the system of Finance Account.

UNIT – I

Branch Accounts – Objects of Branch Accounts – Types of Branches – Dependent Branch – Stock and Debtor System – Accounting System – Independent Branch (foreign branch excluded) – Incorporation of branch trial balance in head office books.

UNIT – II

Departmental Accounts – Distinction between departments and branches – Allocation of Common expenses – expenses other than allocation – Inter departmental transfer at cost of selling price.

UNIT – III

Hire Purchase System – Accounting treatment – Calculation of Interest – books of HirePurchasesandHireVendor–Defaultandrepossession–Hirepurchasetradingaccount – Installment system – Distinction between Hire Purchase and Installment purchase system – Accounting treatment – books of buys and seller.

UNIT – IV

Partnership Accounts – Fundamentals – Profit and Loss appropriation account – Admission – adjustments in the profit sharing ration – adjustment for revaluation of assets and liabilities – treatment of good will – adjustments for good will – adjustment of undistributed profit or loss – adjustment – rearrangement of capitals – Retirement and death of partners – various adjustments – Joint Life Policy.

UNIT – V

Partnership Accounts – Dissolution of firm – Settlement of accounts – accounting treatment for goodwill and unrecorded assets and liabilities – Insolvency of a partner – Garner U Murray – Fixed and Fluctuating Capital – all partners insolvency – Gradual realization and Piecemeal distribution – proportionate Capital Method – Maximum loss Method.

Reference Books:

1. M.C. Shukla, T.S. Growal, Advanced Accounts (Volume 1), S. Chand & Co. Ltd., NewDelhi.
2. T.S. Reddy & A. Murthy – Financial Accounting – Margham Publications,Chennai.
3. R.S.N. Pillai, Bagavathi& S. Uma – Advanced Accounting (Financial Accounting) Volume – 1, S. Chand & Co. Ltd., NewDelhi.
4. R.L. Gupta & V.K. Gupta, Financial Accounting, Sultan Chand & Sons, NewDelhi.
5. S.P. Jain & K.L. Narang, Advanced Accountancy, Kalyani Publications, New Delhi, Ludhiana.
6. Dr. S. Ganesan, S.R. Kalavathy, Thirumalai Publications,Nagarkoil

ALLIED PRACTICAL – 1

A. MATHEMATICAL FOUNDATION &STATISTICS LAB

Exercises:

1. Finding Rank of aMatrix.
2. Verification of Cayley HamiltonTheorem.
3. Tautology andContradiction.
4. Drawing VennDiagrams.
5. Mean – Median – Mode.
6. Mean Deviation – Quartile Deviation, Co-efficient ofVariation.
7. Skewness.
8. Correlation.
9. Regression.
10. MovingAverage.

REFERENCE BOOKS:

1. An Introduction to Symbolic Logic –SussaneKathrina Langer,1937
2. A Mathematical Introduction to Logic – HerbertEndettan,1972
3. Advanced Number Theory with Applications- Hardcover, Mollin ARichard
4. Statistics for Management- by Richard l Levin , David SRubin
5. Complete Business Statistics by Amir D Aczel, JayavelSounderpandian

B. TALLY LAB

1. Prepare trading and Profit and Loss Account and Balance Sheet of aCompany.
2. Cost category and costcentre
3. Bank ReconciliationStatement
4. Inventory andstock
5. Invoicing
6. InterestCalculation
7. Consolidation of accounts
8. SecurityControl
9. Display andReporting
10. Scenario Management and Miscellaneous reports.

REFERENCES:

1. Nandhani A K, Mastering Tally ERP.9, BPB Publications, NewDelhi.
2. Dinesh Maidasani, Mastering Tally ERP.9, Firewall Media, NewDelhi
3. Ashok K Nadhani, Tally ERP

SEMESTER III

PAPER – 3

PROGRAMMING IN C

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- Data types, numerical constants and syntax rules are specified.
- An explanation of how to use the arithmetic operator, the conditional operator, logical operator, and relational operator.
- To learn about arrays and strings.
- Learn how to use C functions.
- Get a better understanding of pointers, structures, and unions.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

- CO1: To get knowledge of the basic computational thinking
- CO2: Develop applications in C using branching and loops.
- CO3: Develop array-based and string-based applications.
- CO4: Create applications that use sequential and random access file processing.
- CO5: Develop a basic understanding of structure in C.

UNIT – I

Overview of C: History - Importance of C - Structure of C programs - Keywords and Identifiers - Constants, Variables, Datatypes, Declaration of variables - Types of Operators- Evaluation of Expression - Operator Precedence and Associatively.

UNIT - II

Managing Input - Output Operators, Decision making Branching and Loops: Types of If statement - Switch statement - Conditional operator - Goto statement - While statement- do statement - for Statement - Continue statement.

UNIT - III

Arrays and Strings: One Dimensional Arrays - Two Dimensional Arrays - Read and Write text - String Handling - Two Dimensional Arrays with String - Pointers - Pointers and Arrays.

UNIT - IV

User-defined functions: Need for functions - Basic form of C functions - Category of functions - Handling Non - Integer Functions - Nesting of Functions - Recursion - Access modifiers - ANSI C Functions - Call by Value, Call by Reference.

UNIT - V

Structures and Unions: Definition of Structure - Structure Initialization - Comparison of Structure Variables - Arrays within Structures - Structures within Structures - Structures and Functions - Unions - Pointers andStructures - File Management in C - Dynamic Memory allocation - Files - Sequential and random accessing - command line arguments -fopen(), fclose(), fread(), fwrite()

Mapping of COs to POs and PSOs

Course Outcome	**PO Addressed PO1 to PO7**	**Correlation Level L/M/H**	**PSO Addressed PSO1 to PSO7**	**Correlation Level L/ M/ H**	**Cognitive Level K1 to K6**
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO2, PSO5	M/M	K3
CO4	PO1, PO5	H/M	PSO3	H	K4
CO5	PO3, PO4	H/M	PSO4	H	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

Text Book:

1. Ashok N. Kamthane, Programming with ANSI and Turbo C, PearsonEducation,2006
2. Dr.P.Rizwan Ahmed, [2016] ”Programming IN (ANSI-C) Margham Publication, Chennai.

Reference:

1. Yashvant P. Kanetkar, “Let Us C”, BPBPublications, 2002.
2. E. Balagurusamy, 'Programming in ANSI C', Tata McGraw Hill, 2004
3. Byron C Gottried, Programming with C”, Schuamsoutline series, 2nd edition, Tata McGraw Hill, 2006.
4. S. Thamaraiselvi, G. Murugesahan, “C for all”, Anuradha agencies.
5. Robert A. Radcliffe, “Encyclopedia C”, BPB Publications.

CORE PRACTICAL – I

PROGRAMMING IN C LAB

1. To find max and min ofnumbers
2. To generate Fibonacciseries
3. npr andncr
4. Matrix addition andsubtraction
5. Transpose of a Matrix Sorting - BubbleSort
6. Sorting - bubblesort
7. Reverse a string and check forpalindrome
8. Counting the number of vowels, consonants, words and white spaces in a line oftext
9. LinearSearch
10. BinarySearch
11. To Store Information of a Student Using Structure
12. Add Two Complex Numbers by Passing Structure to a Function
13. To use Union
14. Copy the contents of a text file onto another file leaving punctuation marks
15. Read a text file and count how many times a given word occurs.

ALLIED – 2

PAPER – 3

Semester: III Paper type: Allied

Paper code: Name of the Paper: Web Designing Credit: 3

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: ….. Practical Hours: …..

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Course Objectives

1. To teach the fundamentals of HTML document with element types, hyperlinks, images, lists, tables and forms

2. To describe the concept of CSS for dynamic presentation effect in HTML documents.

3. To impart the knowledge of mark-up languages for processing, identifying and presenting information in web pages.

4. To facilitate the students to apply Javascript in HTML document to add interactive components to web pages.

5. To illustrate the web page development using Javascript, XML and AJAX.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying unit-1, the student will be able to (1) obtain knowledge about HTML elements; (2) using hyperlinks and lists; (3) displaying images; (4) displaying data using HTML tables; and (5) interacting with users using HTML forms.

2. After studying unit-2, the student will be able to (1) obtain knowledge about various style sheets; (2) link external style sheets; (3) position elements; (4) specify backgrounds; and (5) define element dimensions.

3. After studying unit-3, the student will be able to (1) have knowledge about data types and operators in JavaScript; (2) use JavaScript control statements; (3) define JavaScript functions and arrays; (4) create and use JavaScript Objects; and (5) represent objects using JSON

4. After studying unit-4, the student will be able to (1) have knowledge about Document Object Model (DOM); (2) process HTML elements using DOM; (3) display information dynamically using DOM; (4) have knowledge about JavaScript event handling; and (5) process JavaScript events

5. After studying unit-5, the student will be able to (1) have knowledge about XML; (2) process XML documents using XSL; (3) have knowledge about AJAX; (4) understand the usage of XMLHttpRequest Object; and (5) develop AJAX based applications

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No

3	No	Yes	Yes	Yes	Yes	Yes
4	No	Yes	Yes	Yes	Yes	Yes
5	No	Yes	Yes	Yes	Yes	Yes

Unit-1: Teaching Hours: HyperText Markup Language (HTML): Introduction to HTML – Headings – Linking – Images – Lists – Tables – Internal Linking – Forms – Forms input Types

Unit-2: (50 to 100 contents) Teaching Hours: Cascading Style Sheets (CSS): Introduction – Inline Styles – Embedded Style Sheets – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimensions – Box Model and Text Flow

Unit-3: Teaching Hours: JavaScript: Introduction – Data Types – Operators – Control Statements – Functions – Arrays – Objects – using JSON to represent Objects

Unit-4: Teaching Hours: Document Object Model and Event Handling: Introduction to DOM – DOM Nodes and Trees – Traversing and Modifying a DOM Tree – Introduction to JavaScript Events – load event – mouse events – form events

Unit-5: Teaching Hours: XML and AJAX: Introduction to eXtensible Markup Language (XML) – Document Type Definition (DTD) – XML Schema – eXtensible Stylesheet Language (XSL) and XSL Transformations – Introduction to Asynchronous JavaScript And XML (AJAX) – using the XMLHttpRequest Object – using XML and DOM

Text book:

1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011.

Reference Books:

1. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
2. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013.
3. DT Editorial Services, "HTML 5 Black Book", Dream Tech Publishers, 2016.
4. John Dean, "Web Programming", Jones & Barlett Learning, 2019.

Course Material: website links, e-Books and e-journals

1. www.spoken-tutorial.org
2. Internet Technology (https://nptel.ac.in/courses/106/105/106105084/)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	M	S	M	M	M
CO2	M	S	S	S	M	M	S	M	S	M
CO3	M	S	S	S	M	M	S	M	S	M

CO4	M	S	S	S	M	M	S	M	S	M
CO5	M	S	M	M	M	M	S	M	M	M

ALLIED – 2

PAPER – 3

BUSINESS COMMUNICATION

Objective:

To enable the students to know about the Principles, Objectives and Importance of Communications.

UNIT - I

Features of Business Communication - Importance of Effective Communication in Business - classification of communication - Characteristics (7cs) and guidelines of effective business communication.

UNIT - II

Analysis of business letters - Basic principles in drafting - Appearance, Structure and Layout - letter styles.

UNIT - III

Various types of business letters - Letters of enquiry - offers, Quotations, orders, complaints and settlement, circular letters, status enquiry, collection letters, application for jobs CV, resumes and reference letters.

UNIT - IV

Company correspondence - Correspondence with shareholders, Debenture and Fixed deposit holders.

UNIT - V

Bank and Insurance correspondence, Correspondence with Government departments - Modern methods of correspondence - e-mail, internet, Fax, Video conference and their importance.

Reference Books:

1. Rajendra pal and J.S.Korlahalli Essentials of Business Communication - Sultan Chand & Sons, NewDelhi.
2. Bovee, Thill, Schatzman 7th Edition pearson publication, NewDelhi.
3. Shirley Tayor Communication for business pearson publication, NewDelhi.

ALLIED

PRACTICAL

Semester: III Paper type: Allied Practical

Paper code: Name of the Paper: Web Designing Lab Credit: 2

Total Hours per Week: 3 Lecture Hours: … Tutorial Hours: ….. Practical Hours: 3

……

Course Objectives

1. To teach the usage of hyperlinks, images, lists, tables and forms in web pages
2. To describe the usage of CSS for dynamic presentation in HTML documents.
3. To make the students process, identify and present information in web pages using HTML elements
4. To facilitate the students to add interactive components to web pages.
5. To illustrate the web page development using Javascript, XML and AJAX.

Course Outcomes (five outcomes for each units should be mentioned)

1. The student will be able to use hyperlinks, images, tables and forms.
2. The student will be able to use CSS in web pages.
3. The student will be able to use control structures, classes & objects and JSON
4. The student will be able to display information dynamically using DOM and process JavaScript events
5. The student will be able to process XML documents using XSL and develop AJAX based applications

Programs will be based on the following concepts

1. Hyperlinks, images and tables
2. Form Handling
3. Internal, embedded and external style sheets
4. Decision making and looping
5. Defining and using functions
6. Classes and objects
7. Representing objects using JSON
8. Traversing and Modifying a DOM Tree
9. Mouse and Form events
10. XSL based processing
11. AJAX application

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10

CO1	M	S	M	M	M	M	S	M	M	M
CO2	M	S	S	S	M	M	S	M	S	M
CO3	M	S	S	S	M	M	S	M	S	M
CO4	M	S	S	S	M	M	S	M	S	M
CO5	M	S	M	M	M	M	S	M	M	M

ALLIED

PRACTICAL

BUSINESS COMMUNICATION LAB

Internet Practical

1. To create a dialup connection forinternet
2. To create an e-mailaccount
3. To create & send ane-mail
4. Message Forwarding & Sending e-mail to multipleaddress.
5. Chatting usinginternet.

Reference Books:

1. Electronic Mail – JacobPalme

SKILL BASED ELECTIVE – I

PAPER – 1

Semester: IV Paper type: Skill Based Elective

Paper code: Paper-1 Title of the Paper: E-BUSINESS Credit: 02

Total Hours per Week: 03 Lecture Hours: 03 Tutorial Hours: - Practical Hours: -

……

Course Objectives

1. To know and acknowledge the transition of electronic mode in every field.
2. To realize the power of e-commerce and its functioning.
3. To understand the communication framework and its working.
4. To appreciate the security enrichment to protect electronic mode usuage.
5. To understand the extent of electronic data transfer and electronic fund transfer.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to:
   - *Explain the way business with end-to-end electronic mode is simply possible in reality.*
2. After studied unit-2, the student will be able to:
   - *Justify that internet is the source of all e-commerce and e-business applicaitons.*
3. After studied unit-3, the student will be able to:
   - *Practice the security mechanisms in handling their own data and messages.*
4. After studied unit-4, the student will be able to:
   - *Explain the practicality of Electronic mode in a business application.*
5. After studied unit-5, the student will be able to:
   - *Practice electronic mode of fund handling in all aspects of business transactions.*

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	Yes	No

3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	No	No	No	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit-1: (50 to 100 contents) **Teaching Hours:9**

Introduction to E-Business: Definition - Characteristics of e-Business - E-Business Requirements - Benefits - Advantages and Disadvantages - E-Business Categories: E-Auction - E-Banking - E-Commerce - E - Directories - E-Engineering- E-Franchising - E-Gambling E-Learning - E-Mailing - E-Marketing - E-Supply - E-Trading.

Unit-2: (50 to 100 contents) **Teaching Hours:9**

E-Commerce Framework - Traditional vs. E-Business Applications - Architectural Framework - The Internet as Network Infrastructure - Major Categories of E-Commerce - B2C, B2B, C2B and C2C. - Overview of Communication Network - Communication Processors - Communication Media - Communication Satellite - Wireless Networks - Wireless Internet Access ISDN - Dial-Up –Broadband.

Unit-3: (50 to 100 contents) **Teaching Hours:9**

Firewalls and Securities : OSI Models - Network Security and Firewalls - Protocols - Types - Client Server Network Security - Data and Message Security - Digital Signature, Certificates, Envelopes - Encrypted Documents

Unit-4: (50 to 100 contents) **Teaching Hours:9**

EDI in Business: E-Commerce and World Wide Web - E-Payment Systems - Electronic Data Interchange (EDI) - EDI Applications in Business, Intranet Application in Business

Unit-5: (50 to 100 contents) **Teaching Hours:9**

E-Payment Systems : Online Payment - Payments Cards - Electronic Cash - Electronic Wallets - Digital Cards - Types - Stored Value Cards - Internet Technologies

Text book:

1. R.Kolkota and A.B.Whinston: Frontiers of Electronic Commerce, New Delhi, Addision Wesley,1996.
2. Dr.P.Rizwan Ahmed, [2015], E-Commerce and E-Business, MarghamPublications, Chennai.
3. The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business Paperback - Import, 30 Mar 2004 by JaniceReynolds

Reference Book:

1.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S			M						
CO2										
CO3										
CO4										
CO5										

NON-MAJOR ELECTIVE

PAPER-1

INTRODUCTION INDUSTRY 4.0

Objectives

(i) to introduce the state-of-art standards and techniques of Industry, Industry 4.0
(ii) to make the students understand the tools of Industry 4.0 i.e. digital transformation technologies such as Artificial Intelligence, Big Data and Data Analytics, and Internet of Things
(iii) to describe the applications of the tools of Industry 4.0 such as Artificial Intelligence, Big Data and Data Analytics, and Internet of Things
(iv) to make the students aware of the jobs that will exist in 2030 and prepare them towards this.

Syllabus

Unit I: Industry 4.0

Need—Reason for Adopting Industry 4.0: Definition—Goals and Design Paradigms—Technologies of Industry 4.0—Big Data—Artificial Intelligence (AI)—Industrial Internet of Things—Cybersecurity—Cloud—Augmented Reality

Unit II: Artificial Intelligence

Artificial Intelligence (AI): What and Why?—History of AI—Foundations of AI: The AI Environment—Societal Influences of AI—Application Domains and Tools— Associated Technologies of AI—Future Prospects of AI—Challenges of AI

Unit III: Big Data and IoT

Big Data: Evolution—Data Evolution—Data: Terminologies—Big Data Definitions—Essential of Big Data in Industry 4.0: Big Data Merits and Advantages—Big Data Components: Big Data Characteristics—Big Data Processing Frameworks—Big Data Applications—Big Data Tools—Big Data Domain Stack: Big Data in Data Science—Big Data in IoT—Big Data in Machine Learning—Big Data in Databases—Big Data Use Cases: Big Data in Social Causes—Big Data for Industry - Big Data Roles and Skills: Big Data Roles—Learning Platforms; Internet of Things (IoT): Introduction to IoT—Architecture of IoT—Technologies for IoT—Developing IoT Applications—Applications of IoT—Security in IoT

Unit IV: Applications and Tools of Industry 4.0

Applications of IoT: Manufacturing, Health Care, Education, Aerospace and Defence, Agriculture, Transportation and Logistics—Impact of Industry 4.0 on Society: Impact on Business, Government,

People—Tools for Artificial Intelligence: Big Data and Data Analytics, Virtual Reality, Augmented Reality, IoT, Robotics

Unit V: Jobs 2030

Industry 4.0—Education 4.0—Curriculum 4.0—Faculty 4.0—Skills required for Future—Tools for Education—Artificial Intelligence Jobs in 2030—Jobs 2030: Framework for Aligning Education with Industry 4.0—Framework for Achieving Next Ten Years Vision: Challenges

Books

1. P. Kaliraj, T. Devi, Industry 4.0 Technologies for Education - Transformative Technologies and Applications, 2022, ISBN 9781032139142, CRC Press, Taylor & Francis Group
2. P. Kaliraj, T. Devi, Artificial Intelligence Theory, models and Applications, 2022, ISBN 9781032008097, CRC Press, Taylor & Francis Group
3. P. Kaliraj, T. Devi, Innovating with Augmented Reality: Applications in Education and Industry, 2022, ISBN 9781032008127, CRC Press, Taylor & Francis Group
4. P. Kaliraj, T. Devi, Big Data Applications in Industry 4.0, 2022, ISBN 9781032008110, CRC Press, Taylor & Francis Group

SEMESTER IV

PAPER - 4

JAVA PROGRAMMING

COURSE OBJECTIVES:

- Solve problems by applying the basic concepts of object-oriented programming.
- Know the principles of constructors and inheritance.
- Learn about packages and interfaces.
- To gain a basic understanding of Framework and graphics.
- Understand the connection of JDBC.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

- CO1: Use object oriented programming concepts to solve real world problems.
- CO2:Overloading methods and constructors can be used to develop application programs.
- CO3: Demonstrate different methods of creating and accessing packages.
- CO4: Utilize AWT to design and implement graphical user interfaces.
- CO5: The concept of applets is used to develop web-based dynamic applications.

UNIT- I

Introduction to Java - Features of Java - Object Oriented Concepts - Data Types - Variables - Operators - Control Statements- Arrays - String Handling; Special String Operations; Character Extraction; String Comparison; Searching Strings; String Modification; String Buffer

UNIT- II

Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Using this - Inner Classes - Inheritance - Types of Inheritance -Overriding methods - Using super - Abstract class - Type Wrapper classes for primitive types - Auto boxing and auto Unboxing -Recursion.

UNIT- III

Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - Multithreading - Thread - Runnable Interface - Thread Priority - Synchronization - Inter thread Communication- I/O Packages

UNIT- IV

Collections Framework - Iterators - Interfaces- Utility classes - AWT: Frame - Panel -Event - Event Handling - Listener Interfaces- controls - Layout Managers - Graphics Contexts and Graphics Objects - Color Control - Font Control - Menus with Frames.

UNIT- V

Applets: Life Cycle - lode an Image and audio files - Passing Parameters - Swing: Swing Features - Heirarchy Of Java Swing Classes - Swing GUI Components - Swing Control Classes & Methods - JDBC.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PS01, PSO5	M/M	K1
CO2	PO2, PO4	H/M	PS02, PSO3	H/M	K2
CO3	PO3	H	PSO4,PS06	H/M	K5
CO4	PO5,PO6	M/H	PSO5	M	K6
CO5	PO7	H	PSO4,PSO7	H/H	K4

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

Text Books:

1. Dr.P.Rizwan Ahmed, [2016] Java Programming, Third Edition, Margham Publications, Chennai.

2. Balaguruswamy,E[2000], "Programming with Java -A Primer", Second Edition, Tata McGraw Hill Publishing Company, New Delhi.

References:

1. Herber Schildt,[2002]. "The Complete Reference - Java 2", Fifth Edition, Tata McGraw Hill Publishing Company , Delhi.
2. Java How to Program by Deitel & Deitel - 6th Edition- PHI Publication 2005.

CORE PRACTICAL III

JAVA PROGRAMMING LAB

1. *Writing Java programs by making use of class for the following*
    a. Simple Arithmetic Calculation.

    b. Decision making

    c. Looping Statement
    d. Command line arguments
    e. This keword
2. *Writing Java programs by making use of class, interface, package, etc for the following*

    a. Interfaces

    b. Different types of Inheritences
    c. *Function overloading and overriding*
    d. *Dynamic Method Dispatch*
    e. *Creation of user specific packages*

3. Implement String Manipulation
4. Develop a simple application to handle checked and Unchecked exception
5. Develop a simple multithread Application using Thread class and Runnable Interface
6. *Writing window based GUI applications using frames and applets such as simple arithmetic Calculator application.*

7. Develop a simple GUI application to draw various shapes and handling events

8. Create a simple CUI application to load an Image and Audio Files

9. Create a Personal Information System using Swing.

ALLIED – 2

PAPER - 4

A. OPERATIONS RESEARCH

UNIT – I

Development of OR - Defining of OR - Modeling - Characteristics and Phases - Tools Techniques and Methods - Scope of OR.

UNIT - II

Linear Programming Problem - Formulation - Stack and Surplus variables - Graphical Solution of LPP-Simplex Method - Computational Procedure - Artificial variables techniques - Big M Method and Two PhaseMethod.

UNIT - III

The Transportation and Assignment problem: A streamlined simplex method for the transportation problem, the assignment problem, algorithms for assignment problem.

UNIT - IV

Network Analysis: PERT/CPM - Basic concepts, preparation of network diagram computation of critical path, PERT cost, applications of PERT, Limitations of PERT/CPM.

UNIT - V

Game Theory Introduction - Two person zero sum game - Basic terms - Games with saddle point games without saddle point - Graphical solution - Dominance property - Arithmetic method - General Solution of m*n rectangular game.

TEXT BOOKS:

1. Looma. N.P [1999] “LinearProgramming”.
2. Sharma. J.K, “Operation Research, Theory”, Macmillan,India.
3. Taha, H.A [2002], “Operations Research an Introduction”, Prentice - Hall of India, NewDelhi.
4. Operation Research by Kanti Swarup P.K.Gupta and ManMohan sultan Chand and sonsPublication.

REFERENCES:

1. Hiller, L.S. and G.J. Liebarman, [2001], “Introduction to Operations Research”, McGraw Hill Pub.Co.,
   Singapure.
2. Sharma. J.K [2003], “Operations Research - Theory and Application”,Macmillan

WEB REFERENCES:

1. http://en.wikipedia.org/wiki/Operations_research

2. http://en.wikipedia.org/wiki/Linear_programming
3. http://en.wikipedia.org/wiki/tit_tat
4. http://en.wikipedia.org/wiki/simplex_algorithm

B. COST AND MANAGEMENT ACCOUNTING

UNIT – I

Cost Accounting - Meaning, Definition, Nature and Scope - Objectives -Advantages and limitations - Elements of cost - Financial versus Cost Accounting. Cost System - Types of costing and Cost classification, cost unit- cost centre and profit centre.

UNIT - II

Material Cost: Meaning of material, need of material control - essential material control- advantages, limitations. Store records - purchase order - methods of pricing - issues of material. Methods - FIFO- LIFO - Simple Average- weighted average - Goods Received note - Bin Card - Store Ledger- Purchase, receipts and inspection - Inventory control - EOQ - ABCAnalysis.

UNIT - III

Labor: Meaning of Labor - Importance of Labor, labor cost control, Causes, methods of measurement and reduction of labor turnover - Idle time and over time- methods of wage payment - time rate system - piece rate system: Taylor's, Merricks and Gantt's Task - Premium bonus system - Halsey plan, Rowan plan. Over head: classification of overheads- primary distribution overhead - secondary distribution overheads - direct distribution and continued distribution methods.

UNIT - IV

Management Accounting: Meaning, Definition, Objectives, function, advantages and limitation - difference between management accounting and financial accounting - difference between management account and cost accounting- financial statements - comparative and common size statements - Trendanalysis.

UNIT - V

Fund flow statement: Meaning - uses of fund flow statement - schedule of changes in working capital - fund flow statement - cash flow statement: meaning - uses - difference between fund flow and cash flow statement - preparation of cash flow statement.

Theory:60% Problem:40%

REFERENCE BOOKS:

1. Cost and Management Account -Y.Hari Prasad Reddy, T.S. Reddy - Margam Publications
2. Cost and Management Accounting -S.P.Jain and K.L.Narang- KalyaniPublishers.
3. Cost and Management Accounting -S.N.Mageshwari-SulthanChand
4. Cost and Management Accounting -A.Murthi. -S.V.Publications

ALLIED PRACTICAL – II

OPERATIONS RESEARCH LAB

(O.R Practical)

1. Formulating and solving Linear Program Models [LPM] on a simple spreadsheet such as maximizing revenue - minimizing cost - operating under constraints.
2. Formulating strategies for transporting finished goods formarkets.
3. Traveling salesmanproblem.
4. Computation of critical path for aproject.
5. Computation and applications for gameTheory.

REFERENCES:

1. Hiller, L.S. and G.J. Liebarman, [2001], "Introduction to Operations Research", McGraw Hill Pub.Co.,Singapure.
2. Sharma. J.K [2003], "Operations Research - Theory and Application",Macmillan

COST AND MANAGEMENT ACCOUNTING LAB

1. Prepare FIFO with the help of your owndata.
2. Prepare LIFO with the help of your owndata.
3. Prepare Simple Average with the help of your owndata.
4. Prepare Weighted Average with the help of your owndata.
5. Preparation of Overhead with primarydistribution.
6. Preparation of Overhead with secondarydistribution.
7. Calculated comparative balance sheet with your imaginaryfigure.
8. Prepare common size statement with imaginaryfigure.
9. calculate trendanalysis
10. Preparation of fund flow statement with imaginaryfigure.
11. Preparation of cash flow statement with imaginaryfigure.

REFERENCE BOOKS:

1. Cost and Management Account -Y.Hari Prasad Reddy, T.S. Reddy - Margam Publications
2. Cost and Management Accounting -S.P.Jain and K.L.Narang- KalyaniPublishers.
3. Cost and Management Accounting -S.N.Mageshwari-SulthanChand
4. Cost and Management Accounting -A.Murthi. -S.V.Publications.

SKILL BASED SUBJECT

PAPER – 2

COMPUTER NETWORKS

Semester: IV Paper type: Skill Based Elective

Paper code: Name of the Paper: Computer NetworkS Credit: 2

Total Hours per Week: 03 Lecture Hours: 03 Tutorial Hours: …. Practical Hours: ---

……

Course Objectives

1. To provide fundamental knowledge about Computer Networking
2. To provide students with skills in certain aspects of Networking such as Switching, Security, and understanding of various network protocols.
3. Understand the Data Communications System method and components.
4. To identify various Network topologies and protocols, as well as to investigate various network devices and their operations inside a network.
5. Familiarity with basic Computer Network protocols and how they might be utilised in network design and implementation

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to acquire knowledge in Data Communication
2. After studied unit-2, the student will be able to understand Networks and Wireless Network,
3. After studied unit-3, the student will be able to know the IEEE standards for Networks.
4. After studied unit-4, the student will be able to understand TCP/IP Protocol Architecture
5. After studied unit-5, the student will be able to use Cryptography and Security Services:

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	No	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	No	Yes	No	Yes

5	Yes	Yes	No	No	No	Yes

Unit-1: **Teaching Hours: 5**

Theoretical basis of data communication; analogy and digital signals; asynchronous and synchronous transmission; data encoding and modulation, techniques, broadband and baseband transmission; pulse code modulation, bandwidth, channel, baud rate of transmission; multiplexing; transmission medium; transmission errors, error detection and correction.

Unit-2: **Teaching Hours: 5**

Local area networks, metropolitan area network, wide area network, wireless network, internetworking; switched multi-megabit data services, X.25, frame relay, narrow band and board ISDN asynchronous transfer modes. Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO-OSI reference model, TCP/ IP reference model; internet protocol stacks.

Unit-3 **Teaching Hours: 5**

Framing, error control, flow-control; sliding window protocol; Data link layer of Internet and ATM. **Medium Access Control Sub-layer:** CSMA/CD protocol, switched and fast Ethernet, token ring, IEEE standards for LAN and MAN; satellite networks.

Unit-4: **Teaching Hours: 5**

Switching mechanism: Circuit switching, message switching, packet switching, cell switching, routing and congestion control, TCP/IP protocol architecture. **Network Applications:** File transfer protocol, electronic mail, World Wide Web.

Unit-5: **Teaching Hours: 5**

Cryptography: symmetric key cryptography, asymmetric key cryptography, security services: message confidentiality, message integrity, message authentication, entity authentication, digital signature key management, security in internet: IP Sec, SSL/TLSPGP, Firewalls. Introduction to MPLS, VPN, Traffic Engineering, RSVP (reservation protocol), Tunneling, QoS.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. Computer Networks, A.S. Tanebaum, Prentice-Hall of India, (4th ed.),
2. Data Communications and Networking, Behrouz Forouzan and S.C., Fegan, McGraw Hill
3. Introduction to Data Communications and Networking, Behrouz Forouzan, Irwin Professional Publication

Reference Book:

1. Computer Networks: A system Approach, Peterson and B.S. Davie , Morgan Kaufmann.
2. Data and Computer Communications, William Stallings, Pearson Education.
3. Introduction to Data Communications and Networking, W. Tomasi, Pearson, Education.
4. Data Communications and Computer Networks, P.C. Gupta, Prentice-Hall of India.
5. Cryptography and Network Security - Principles and Practice, Seventh Edition,| By Pearson by Stallings William
6. AICTE Recommended| Data and Computer Communication, By Pearson, by Stallings William
7. Computer Network For MU B.E. Computer Engineering, by J.S. Katre
8. Computer Networks: Principles, Technologies And Protocols For Network Design, by Natalia Olifer and Victor Olifer
9. Computer Networks and Internets, by Douglas E. Comer
10. Cryptography and Network Security - Principles and Practice, Seventh Edition, By Pearson, by Stallings William

Course Material: website links, e-Books and e-journals

1. http://www.science.smith.edu/~jcardell/Courses/EGR328/Readings/KuroseRoss%20Ch1.pdf
2. https://cseweb.ucsd.edu/classes/wi19/cse124-a/courseoverview/compnetworks.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	M	S	S
CO2	M	S	M	S	M	M	M	M	S	S
CO3	S	M	S	M	S	M	M	S	M	S
CO4	M	S	S	S	M	S	M	M	S	M
CO5	S	S	M	M	M	M	S	M	S	S

NON MAJOR ELECTIVE

PAPER – 2

MANAGEMENT INFORMATION SYSTEM

Semester: IV Paper type: Non-Major Elective

Paper code: Name of the Paper: Management Information System Credit: 2

Total Hours per Week: 02 Lecture Hours: 02 Tutorial Hours: …. Practical Hours: ---

……

Course Objectives

1. To provide knowledge of the fundamental ideas of Data Resource Management
2. To provide students with skills in certain aspects of Business applications, development and Management
3. Understand the e-Business systems and e-Business Decision Support.
4. To identify various development in e-Business Strategies and Solutions.
5. Familiarity with basic Security and Ethics in E-Business and how they might be utilised

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand about Data Management
2. After studied unit-2, the student will be able to know about Business applications
3. After studied unit-3, the student will be able to grasp the ideas of e-Business systems
4. After studied unit-4, the student will be able to know about e-Business Strategies
5. After studied unit-5, the student will be able to understand about Security and E-Business

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	No	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	No	Yes	No	Yes

5	Yes	Yes	No	No	No	Yes

Unit-1: **Teaching Hours: 5**

IT Foundation Concepts: Computer Hardware – Software – Data Resource Management – Telecommunications and Networks

Unit-2: **Teaching Hours: 5**

IS in Business Applications: Information Systems and Technologies – Business applications, development and Management

Unit-3 **Teaching Hours: 5**

E-Business and E-Commerce: The e-Business enterprise – e-Commerce – e-Business systems– e-Business Decision Support

Unit-4: **Teaching Hours: 5**

Development Process: Developing e-Business Strategies and Solutions

Unit-5: **Teaching Hours: 5**

Security and Ethics in E-Business: Security, Social and Ethical Challenges in e-Business Enterprise and Global Management of e-Business Real World Cases Icongo, yahoo, IBM, SAP, Oracle, Siebel, Wall Mart

Text book:

1. Management Information Systems, Sixth Edition, James A.O' Brien, Tata-McGraw Hill Edition.

Reference Book:

6. Management Information Systems: Managing the Digital Firm, Fourth Edition by Jane Laudon and Kenneth C. Laudon, Published by Pearson India Education service Pvt Ltd

2. Management Information Systems, seventh Edition by Kenneth J. Sousa and Effy Oz, Published by CENGAGE Learning

3. Fundamentals of Information Systems, eight Edition by Ralph Stair, Published by CENGAGE Learning

4. Management Information Systems: Managing Information Technology in the E-business Enterprise, fourth Edition, by James. O'Brien, Galgotia Publication Pvt Ltd

5. Information Systems Today: Managing in the Digital World, eight Edition, by Leonard Jessup, Published by Pearson

Course Material: website links, e-Books and e-journals

1. https://www.sscasc.in/wp-content/uploads/downloads/ComputerScience/MIS-ERP.pdf

2. https://sctevtservices.nic.in/docs/website/pdf/140304.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	M	S	S
CO2	M	S	M	S	M	M	M	M	S	S
CO3	S	M	S	M	S	M	M	S	M	S
CO4	M	S	S	S	M	S	M	M	S	M
CO5	S	S	M	M	M	M	S	M	S	S

SEMESTER V

PAPER – 5

PRINCIPLES OF MANAGEMENT

UNIT – I

Fundamentals of Managements - Basic Principles and Process of Management and administration - Planning - Distinguishing between operational and Strategic Planning.

UNIT - II

Functions of Managers: Planning - Organizing - Staffing - Leading - Controlling Control techniques and Information technology.

UNIT - III

Levels of Managements: Top-Level Managers - Middle-Level Managers - First-Level Managers - Time Spent in carrying out Managerial Functions.

UNIT - IV

Management Skills and Organizational Hierarchy: Technical Skills - Human Skills - Conceptual Skills - DesignSkills.

UNIT - V

Approaches to Management: methods for performing jobs-select workers with appropriate abilities for each job - Training for standard task- planning work and eliminating interruptions - wage incentive for increase for increaseoutput.

TEXT BOOKS:

1. Koontz Harrold and weihrich Heinz [1990], "Essentials of Management - McGraw Hill, FifthEdition.
2. Tripathy and P.N.Reddy [1992]: Principles of Management, Tata McGraw Hill, New Delhi.

REFERENCES:

1. Button Gene and Thakur Manab [1996], "Management Theory - Principles and Practice", Tata McGraw Hill, New Delhi.
2. Chandra Bose [2001], "Principles of Management and Administration", Prentice Hall of India, Delhi.
3. Robbines [2002], "Management", 7th Edition, Pearson Education,Delhi.

PAPER – 6

DATABASE MANAGEMENT SYSTEM

Semester: V Paper type: Core Theory

Paper code: Name of the Paper: Database Management System Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. To teach the fundamentals of Databases, ER models with mapping constraints

2. To describe the concept of tuples, query languages in database.

3. To impart the knowledge of DDL and DML.

4. To facilitate the students to work with checking constraints and query building.

5. To illustrate the stored procedures and exception handling.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying unit-1, the student will be able to (1) obtain knowledge about databases; (2) have an overall idea about system structure; (3) obtain knowledge about ER model ; (4) mapping constraints and (5) ER diagrams and purpose of database.

2. After studying unit-2, the student will be able to (1) obtain knowledge about relational model; (2) use of formal query language; (3) have knowledge about relational algebra (4) tuples and domains; and (5) relational calculus.

3. After studying unit-3, the student will be able to (1) have knowledge about data types in oracle; (2) Data Definition Language; (3) Data Manipulation Language; (4) Transactional Control Language; and (5) have knowledge about Data Control Language

4. After studying unit-4, the student will be able to (1) have knowledge about basic join queries; (2) usage of set operators (3) understand integrity constraints; (4) have knowledge about set operators; and (5) Union, primary and not null constraints

5. After studying unit-5, the student will be able to (1) have knowledge about stored procedures; (2) understand blocks and procedures; (3) Cursor management; (4) understand triggers; and (5) Exception handlers

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No

2	Yes	Yes	Yes	Yes	No	Yes
3	No	Yes	Yes	Yes	No	Yes
4	Yes	Yes	No	Yes	No	Yes
5	No	Yes	Yes	Yes	Yes	Yes

Unit-1: **Teaching Hours:**

Introduction: Database - Definition of DBMS - purpose of Database - Overall System structure - Entity Relationship model - Mapping constraints - E.R Diagrams

Unit-2: **Teaching Hours:**

Relational Model - Structure - Formal Query Language - Relational Algebra - Tuple and Domain Relational Calculus.

Unit-3: **Teaching Hours:**

Oracle: Data types - SQL - Data Definition Language (DDL): Creating table – Altering table - Truncating Table dropping a table. Data Manipulation Language (DML): Insert, select, update and delete command. Transactional Control Language: commit, Rollback. Data Control Language: Grant and Revoke privileges

Unit-4: **Teaching Hours:**

Joins - simple join, self join, Outer join. Set Operators - Union, Union all, Intersect, minus. Integrity Constraints - Unique, primary key constraints, Not Null, check constraint.

Unit-5: **Teaching Hours:**

PL/SQL: PL/SQL blocks - procedures - functions - Cursor management - triggers- Exception Handling.

Text book:

1. Singh - Database System: Concepts, Design & Applications, Pearson Education.
2. Abraham Silberschatz, H.F.Korth and S.Sundarshan- Database system concepts- Mcgraw Hill Publications.
3. Michael Abbey and Micael. J.Corey- Oracle - A Beginners guide. TMH

Reference Books:

5. Guido Van Rossum, Fred L Drake Jr, “An Introduction to Python”, Network Theory Ltd, 2011

6. Mark Lutz, “Learning Python”, O’Reilly, 2013
7. Mark Summerfield, “Programming in Python 3”, Pearson Education, 2018.
8. Nageswara Rao R, “Core Python Programming”, Dreamtech Press, 2021

Course Material: website links, e-Books and e-journals

1. http://www.cs.sfu.ca/CourseCentral/354/zaiane/material/notes/contents.html
2. www.tutorialspoint.com/dbms/
3. www.studytonight.com/dbms/
4. codex.cs.yale.edu/avi/db-book/db6/slide-dir/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	S	M
CO2	S	S	M	M	M	S	S	M	S	S
CO3	S	M	S	S	M	M	S	M	S	S
CO4	S	S	S	M	S	M	M	M	S	M
CO5	S	S	M	S	S	M	S	M	M	S

1.

PAPER – 7

PYTHON PROGRAMMING

Semester: V Paper type: Core Theory

Paper code: Name of the Paper: Web Designing Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. To teach the fundamentals of Python Language including Python interpreter, data types in Python

2. To describe the concept of control structures, functions and exception handling in Python.

3. To impart the knowledge of classes and objects in Python.

4. To facilitate the students to work with file input/ output using Python.

5. To illustrate the web programming and database programming using Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying unit-1, the student will be able to (1) obtain knowledge about execution of Python programs; (2) have an overview of Python programming; (3) obtain knowledge about various data types ; (4) use various operators; and (5) use sequence data types such as lists and dictionaries.

2. After studying unit-2, the student will be able to (1) obtain knowledge about various control structures; (2) use control structures; (3) have knowledge about various types of function arguments; (4) define and call functions; and (5) raise & handle exceptions.

3. After studying unit-3, the student will be able to (1) have knowledge about object oriented programming in Python; (2) define classes; (3) create and use instances of classes; (4) understand inheritance; and (5) have knowledge about built-in functions for classes

4. After studying unit-4, the student will be able to (1) have knowledge about basics of file handling; (2) use built-in file functions (3) understand standard files; (4) have knowledge about file system; and (5) process files using command line arguments

5. After studying unit-5, the student will be able to (1) have knowledge about web programming; (2) understand common gateway interface (CGI); (3) create web clients; (4) understand database programming; and (5) develop DB-API based applications

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	No	Yes	Yes	Yes	No	Yes
4	No	Yes	Yes	Yes	Yes	Yes
5	No	Yes	Yes	Yes	Yes	Yes

Unit-1: **Teaching Hours: Introduction to Python:** Python Features - using the Python interpreter - Overview of programming in Python - Program input and

Program output – Comments – Operators – Variables and Assignment – Numbers – Strings – Lists and Tuples – Dictionaries

Unit-2: Teaching Hours: Control Structures, Functions and Exception Handling: if statement – conditional expression – while statement – for statement – Functions – Formal Arguments – Variable Length Arguments – Exceptions – Detecting and Handling Exceptions – Raising Exceptions

Unit-3: Teaching Hours: Classes and Objects: classes – class attributes – instances – instance attributes – binding and method invocation – inheritance – Built-in functions for classes and instances

Unit-4: Teaching Hours: File and Input/ Output: File Objects – File Built-in Functions – File Built-in Methods – File Built-in Attributes – Standard Files – Command Line Arguments – File System – File Execution

Unit-5: Teaching Hours: Web Programming and Database Programming: Web Surfing with Python – Advanced Web Clients – Common Gateway Interface (CGI) – Building CGI Applications – Python Database Application Programmer's Interface (DB-API) – Object Relational Managers – Related Modules

Text book:

2. Wesley J Chun, "Core Python Programming", Second Edition, Prentice Hall, 2006.

Reference Books:

9. Guido Van Rossum, Fred L Drake Jr, "An Introduction to Python", Network Theory Ltd, 2011
10. Mark Lutz, "Learning Python", O'Reilly, 2013
11. Mark Summerfield ,"Programming in Python 3", Pearson Education,2018.
12. Nageswara Rao R, "Core Python Programming", Dreamtech Press, 2021

Course Material: website links, e-Books and e-journals

1. www.spoken-tutorial.org
2. Python for Data Science, (https://swayam.gov.in/)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	M	M	M
CO2	S	M	M	S	M	M	S	M	S	M
CO3	S	S	S	S	S	M	S	M	S	S
CO4	S	S	M	S	S	M	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	S

CORE PRACTICAL III

PYTHON PROGRAMMING LAB

Semester: V Paper type: Core Practical

Paper code: Name of the Paper: Python Programming Lab Credit: 2

Total Hours per Week: 3 Lecture Hours: …. Tutorial Hours: ….. Practical Hours: 3

……

Course Objectives

1. To teach the usage of data types in Python programs
2. To describe the usage of control structures, functions and exception handling in Python programs.
3. To make the students use classes and objects in Python programs.
4. To facilitate the students to work with file input/ output in Python.
5. To teach students to develop web and database based applications in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. The student will be able to write programs using fundamental and sequence data types.
2. The student will be able to write programs using control structures, functions and exceptions.
3. The student will be able to create and use classes and objects in programs
4. The student will be able to work with files in Python
5. The student will be able to write web and database based applications

Programs will be based on the following concepts

1. Simple Arithmetic Calculation.
2. Decision making and looping statements
3. String Manipulation
4. Lists and Dictionaries
5. Functions
6. Exception Handling
7. Inheritance
8. File Input/ Output
9. Web Clients
10. Database Application

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	M	M	M
CO2	S	M	M	S	M	M	S	M	S	M
CO3	S	S	S	S	S	M	S	M	S	S
CO4	S	S	M	S	S	M	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	S

CORE PRACTICAL IV

DATABASE MANAGEMENT LAB

Semester: V Paper type: Core Practical

Paper code: Name of the Paper: DBMS Lab Credit: 2

Total Hours per Week: 3 Lecture Hours: …. Tutorial Hours: ….. Practical Hours: 3

……

Course Objectives

1. To teach the usage of database management systems
2. To describe the usage of integrity rules and constraint checks
3. To make the students to perform DDL and DML.
4. To facilitate the students to work with setting key constraints.
5. To teach students to write functions and exceptional handlers.

Course Outcomes (five outcomes for each units should be mentioned)

1. The student will be able to create databases and perform DDL and DML.
2. The student will be able to write queries to insert, modify and delete data.
3. The student will be able to write functions and trigger to update tables
4. The student will be able to work constraint checks
5. The student will be able to work with exception handlers and procedure blocks

Programs will be based on the following concepts

1. Create a table Student-master with the following fields client_no,name, address, city, state,pincode,remarks,bal_due with suitable data types. a) Create another table supplier_table from client_master. Select all the fields and rename client_no with supplier_no and name with supplier_name. b) Insert data into client_master c) Insert data into supplier_master from client_master. d) Delete the selected row in theclient_master.

2. Create a table sales_order with s_order_no and product_no as primary key. Set other fields to store client number, delivery address, delivery date,order status. a) Add a new column for storing salesman number using ALTER Command. b) Set the s_order_no as foregin key as column constraints. c) Set the s_order_no as foreign key as table constraints. d) Enforce the integrity rules usingCHECK.

3. Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following. a) Select the student's name column. b)

Eliminate the duplicate entry in table. c) Sort the table in alphabetical order. d) Select all the Students of a particulardepartment.

4. Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate, profit_percent, sell_price, supplier_name. a) Select each row and compute sell_price*.50 and sell_price*1.50 for each row selected. b) Select product_no, profit_percent, Sell_price where profit_per is not between 10 and 20 both inclusive. c) Select product_no, description, profit_percent, sell_price where profit_percent is not between 20 and d) Select the suppliername and product_no where suppliername has ‘r’ or ‘h’as secondcharacter.

5. Create a table master_book to contain the information of magazine code, magazine name, publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update, delete operations on the above table.

6. Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phonenumbers.

7. Create a table stock to contain the item code, item name, current stock, date of last purchase. Write a stored procedure to seek for an item using item code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock.

8. Create a table to store the salary details of the employees in a company. Declare the Cursor to contain employee number, employee name and net salary . Use Cursor to update the employee salaries.

9. Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.

10. Create a table to store the details of the Aluminus in an institution. Write a PL/SQL block to change address of a particular alumni. Write proper exceptions and appropriate error messages.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	S	M	M
CO2	S	S	M	M	M	S	S	M	M	M

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

ELECTIVE SUBJECT

PAPER – I

ENTERPRISE RESOURCE PLANNING

UNIT - I

Business function and Business process: Functional areas and Business Process - functional area of operations - Business process - Marketing Sales - supply chain management - Accounting and finance - Human Resource - Functional areas of information system - The development of ERP system SAP R/3 - New directions in ERP - significance and benefits of ERP software and systems.

UNIT - II

Marketing information system and sales order process in ERP: sales and Distribution in ERP - Pre sales activities - sales order processing - inventory Sourcing - Delivery - Billing - payment - Customer relationship Management - benefits of CRM.

UNIT - III

Production and supply chain management information system: Production overview - The production planning process - The SAP ERP Approach to production planning - Sales forecasting - sales and operation Planning - Demand management - Material requirement planning in SAP ERP - ERP and supplier - Supply chain

UNIT - IV

Accounting in ERP: Accounting activities - using ERP for accounting Information - operational decision making problem - credit management - Industrial credit management in SAP ERP - product profitability analysis - Management reporting with ERP system - Document flow for customer Service.

UNIT - V

Human resource process in ERP: HR with ERP - Advance HR features - Time management - Payroll - Travel management - Training and Development - Management by objectives - ERP processmodeling.

TEXT BOOKS

1. ELLEN MONK and BRET WAGNER, ENTERPRISE RESOURCE PLANNING- 3rd edition -MGH.
2. Dr.P.Rizwan Ahmed, Enterprise Resource Planning, Margham Publications,Chennai

B. BIOINFORMATICS

UNIT – I

Proteins; Characterization of protein molecules - sedimentation analysis molecular exclusion, chromatography and SDS gel electrophoresis. Determination of amino acid sequence of proteins. Chemical synthesis ofpeptides.

UNIT - II

Denaturation and renaturation, orders of protein structure, primary and secondary structures - a - helix, β sheet and β - turns. Tertiary structure - a and β.

UNIT - III

Nucieic acids and DNA double helical, Watson and Crick Model. A,B,Z, forms. Triple and Quadruple structures. Concepts of Replication, transcription and translation.

UNIT - IV

Molecular markers for mapping. RFLPs, Chromosome walking. STS and ESTs, positional cloning, SAGE and Cluster analysis. Software programmes and database tools. Sequence analysis at whole genome level: BCRs. ACRs, orthologues, paralogues orphan genes.

UNIT - V

Scope of bioinformatics, useful search engines, Boolean searching, uses of Nucleic acid databases, proteins sequences [NCBI, Swiss port, Beranda] using of software like FASTA and BLAST, HEX, Vasmol, Swiss PDB, Arguslab.

TEXTBOOKS:

1. Lesk, A.M., [2002], "introduction to Bioinformatics", Oxford Uni. Press, NewDelhi.
2. Lewin, B.,[2000], "Genes VIII". Oxford Uni. Press, NewDelhi
3. Ranga, M.M.,[2004], " Bio informatics", Panima Book Publishing Company,New Delhi.

REFERENCES:

1. Primrose,[2003], " Principles of genome analysis", BlackwellScience.
2. Campbell and Heyer, [2002], " Discovering genomics, proteomics and bioinformatics", Cold spring Harbor LaboratoryPress,
3. Nicholl, D.S.T., [2002], " An introduction to genetic engineering". 2nd Edition. Cambridge universityPress,

WEB RESOURCES:

1. http://www.ensebl.org
2. http://www.ncbi.nlm.high.gov/genbank
3. http://www.proteinstructure.com

C. MARKETING MANAGEMENT

UNIT - I

Fundamentals of marketing - Role of marketing - Relationship of marketing with other functional areas - Concept of marketing - various definitions of marketing- Marketing management of product services and selling - Marketing approaches - various environmental factors affecting the marketing functions.

UNIT - II

Buyer Behavior - consumer goods and Industrial goods - Buying motives - Buyer Behavior model- Factors influencing buyer behavior.Market Segmentation - Need and Basis of Segmentation - Marketing Strategy- Segmentation - Targeting - Positioning.

UNIT - III

Sales Forecasting - Various methods of Sales Forecasting - Analysis and Application. Product - Characteristics - Benefits - Classification - New Product development process - Product life cycle - Product Portfolio analysis - Product line and Product mix decision.

UNIT - IV

Pricing - factors influencing pricing decisions- pricing objectives - pricing policies and procedures - pricing strategies - physical distribution - importance of various kinds marketing channels- Distribution problems.

UNIT - V

Promotion - Advertising - Publicity - Public relations - Personal Selling - Sales promotion administration.

REFERENCE BOOK:

1. Marketing - Rajan Nair -Sulthan Chand &Co.
2. Marketing -J.Jaya Shankar - MargamPublication
3. Marketting Management - Saxena –McGrawHils
4. Modern Marketting-R.S.N.Pillai and Bagvathi -S.Chand.

SKILL BASED SUBJECT

PAPER – 3

ENTREPRENEURIAL DEVELOPMENT

OBJECTIVE:

To gain knowledge about setting - up and managing a business

UNIT - I

Meaning of Entrepreneur - Entrepreneur and Enterprise - Entrepreneur and manager - Entrepreneur and Entrepreneur - Qualities (Traits) of a True Entrepreneur Characteristics of Entrepreneur - Types of Entrepreneurs - Functions of an Entrepreneur - Roles of Entrepreneurs in the Economic Development.

UNIT - II

Establishing an Enterprise - Project Identification - Selection of the Product - Project Formulation - A Assessment of Project Feasibility - Preparation of Project Report - Selection of Site(Location)

UNIT - III

Selection of Types of Organization - Sole Proprietorship - Partnership joint stock Company - Factors Influencing the Choice of Organization - Sources of Project Finance - Sources of Long Term Finance - Sources of Short Term Finance.

UNIT - IV

Incentives and Subsidies - Meaning of Incentives and Subsidies - Need and Problems Incentives for Development of Backward Area - Incentives for SSI Units in BackwardAreas - Incentives for SSI Units - Subsidies and Incentives in TamilNadu.

UNIT - V

Women Entrepreneurs - Concept - Functions and Role - Problems of Women Entrepreneurs - Suggestions for Development of Women Entrepreneurs - Rural Entrepreneurship - Need - Problems - How to Develop Rural Entrepreneurship.

REFERENCE BOOKS:

1. C.B.Gupta- Entrepreneurship Development in India - SultanChand
2. Jayashree Suresh - Entrepreneurial Development -MarghamPublications
3. P. saravanavel- Entrepreneurial development - Ess pee kay pub.House
4. Dr.S.S.Khanka- Entrepreneurial Development -S.Chand.

SEMESTER VI

PAPER – 8

COMPUTER GRAPHICS AND WEB DESIGNING

Semester: V Paper type: Core Theory

Paper code: Name of the Paper: Computer Graphics and Web Designing Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. To teach the fundamentals of computer graphics

2. To describe the concept of two dimensional and three dimensional objects.

3. To impart the knowledge of transformation techniques.

4. To facilitate the students to design web page and simple web applications.

5. To illustrate the CSS, creation of simple servlets and JDBC connections.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying unit-1, the student will be able to (1) obtain knowledge about computer graphics systems; (2) have an overall idea about video display devices; (3) obtain knowledge about raster scan and random scan systems ; (4) obtain idea about the algorithms and (5) understand on character generation, curves and characters

2. After studying unit-2, the student will be able to (1) obtain knowledge about two dimensions and geometric transformation; (2) understand the concepts of viewing techniques; (3) have knowledge about windowing and reference clipping (4) Basic transformation; and (5) Scaling and rotation

3. After studying unit-3, the student will be able to (1) have knowledge about three dimensional objects; (2) Stereoscopic views; (3) understand the concepts of spines and curves; (4) 3D Viewing; and (5) have knowledge about surface rendering and color animations

4. After studying unit-4, the student will be able to (1) have knowledge about designing web pages; (2) usage of JavaScript (3) understand functions and arrays; (4) have knowledge about objects; and (5) creation of simple web applications

5. After studying unit-5, the student will be able to (1) have knowledge about dynamic HTML; (2) understand CSS and servlets; (3) Web server setups; (4) understand HTTP GET and POST requests; and (5) Cookies and JDBC connectivity

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes

2	Yes	Yes	Yes	Yes	No	Yes
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	No	Yes	Yes	Yes
5	No	Yes	Yes	No	Yes	Yes

Unit-1: **Teaching Hours:**

Overview of Computer Graphics System: Overview of Computer Graphics system - Video display devices - Raster Scan and random scan system - Primitives and Attributes: Drawing a line, circle and ellipse generating algorithms - Scan line algorithm - Character generation - attributes of lines, curves and characters

Unit-2: **Teaching Hours:**

TWO Dimensional Viewing and Geometric Transformation: Principles of viewing - windowing - clipping - co-ordinate reference frame - basic transformation - scaling and rotations.

Unit-3: **Teaching Hours:**

THREE Dimensional Objects: Object display methods - Depth Presentation - stereoscopic views - surface models -cubic's- spines and curves - 3D viewing - Elimination and surface rendering - Color and animation.

Unit-4: **Teaching Hours:**

HTML - Forms - Tables - Web page design - Java Script Introduction - Control Structures - Functions - Arrays - objects - simple web application.

Unit-5: **Teaching Hours:**

Dynamic HTML - Introduction -Cascading style sheets - Servlets - Deployment of simple servlets - Web Server(Java web server/Tomcat/web logic) - HTTP GET and POS Requests - Session - Cookies- JDBC connectivity.

Text book:

1. Asthana, R.G.S. and Sinha, N.K.,(1996),"Computer Graphics" New Age Int.Pub.(p)Ltd.,publishers.

2. Hearn, D. and Pauline Baker, M. (1987),"Computer Graphics(C-Version)" 2nd Edition, Pearson Education,Delhi.

3. Jennifer Niederst(1999) Web Design in a Nutshell, Shroff Publishers Pvt. Ltd, Mumbai

Course Material: website links, e-Books and e-journals

5. www.tutorialspoint.com/computer_graphics/
6. https://www.geeksforgeeks.org/computer-graphics-2/
7. https://tutorialspoint.dev/computer-science/computer-graphics

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	M
CO2	S	S	M	M	M	S	S	M	S	S
CO3	S	M	M	S	M	S	S	S	S	S
CO4	S	S	S	M	S	M	M	M	S	M
CO5	S	S	S	S	S	M	S	M	M	M

PAPER – 9

SOFTWARE ENGINEERING

Semester: VI Paper type: Core Theory

Paper code: **Name of the Paper:** SOFTWARE ENGINEERING **Credit:4**

Total Hours per Week:4 Lecture Hours: ….. Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. To understand the phases in a software project

2. To understand fundamental concepts of requirements engineering and Analysis Model.

3. To understand the various software design methodologies.

4. To learn various testing and maintenance measures

5. To learn various software management and scheduling models.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand software process model.

2. After studied unit-2, the student will be able to understand requirement analysis and engineering concepts.

3. After studied unit-3, the student will be able to understand design concepts.

4. After studied unit-4, the student will be able to understand software testing concepts.

5. After studied unit-5, the student will be able to understand software project management and scheduling concepts..

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents) **Teaching Hours: 9 hrs**

SOFTWARE PROCESS MODELS: Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models

Unit-2: (50 to 100 contents) **Teaching Hours: 9 hrs**

REQUIREMENTS ANALYSIS AND SPECIFICATION: Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, requirements validation, requirements management, Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.

Unit-3: (50 to 100 contents) **Teaching Hours: 9 hrs**

SOFTWARE DESIGN: Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design –Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

Unit-4: (50 to 100 contents) **Teaching Hours: 9 hrs**

TESTING AND MAINTENANCE: Software testing fundamentals- black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing - White box testing – basis path testing, control structure testing - Maintenance and Reengineering-Reengineering process model-Reverse and Forward Engineering.

Unit-5: (50 to 100 contents) **Teaching Hours: 9 hrs**

PROJECT MANAGEMENT: Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process - Risk Management.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self-discussion, self-learning process.
i. Following institution and intellectual and writing reports in the course field.

j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. Roger S. Pressman, ―Software Engineering – A Practitioner's Approach, Seventh Edition, McGraw-Hill International Edition, 2010.

2. Ian Sommerville, ―Software Engineering, 9th Edition, Pearson Education Asia, 2011.

Reference Book:

1. Rajib Mall, ―Fundamentals of Software Engineering, Third Edition, PHI Learning Private Limited, 2009.

2. Kelkar S.A., ―Software Engineering, Prentice Hall of India Pvt Ltd, 2007.

3. Stephen R.Schach, ―Software Engineering, Tata McGraw-Hill Publishing Company Limited,2007.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S			M						
CO2										
CO3										
CO4										
CO5										

PAPER – 10
MULTIMEDIA

Semester: VI Paper type: Core

Paper code: Name of the Paper: MULTIMEDIA Credit:4

Total Hours per Week:4 Lecture Hours: ….. Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. Apply the knowledge of the basic fundamentals components of Multimedia
2. To apply the animatic effects for basic multimedia formats
3. Effective learning about multimedia system design
4. Effective learning about file handling
5. Creation of hypermedia applications

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand fundamental Concepts of Multimedia.
2. After studied unit-2, the student will be able to understand multimedia applications with animatic effects.
3. After studied unit-3, the student will be able to understand multimedia system architecture.
4. After studied unit-4, the student will be able to understand multimedia file handling concepts.
5. After studied unit-5, the student will be able to understand hypermedia concepts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	yes
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents) **Teaching Hours: 9 hrs**

INTRODUCTION TO MULTIMEDIA: Introduction to making Multimedia- Multimedia Skills and training- Text: Using text in Multimedia- Computer and Text- Font Editing and Design Tools- Hypermedia and Hypertext

Unit-2: (50 to 100 contents) **Teaching Hours: 9 hrs**

MULTIMEDIA BASICS AND APPLICATIONS: Multimedia Applications - Animation: principle of animation, cell animation, kinematics, morphing. Video – Broadcast video standards (NTSC, PAL), Integrating computer and television, video capture board, video, colour, shooting and editing video, recording formats 9S-VHS) video hardware resolution, video compression (JPEG, MPEG)

Unit-3: (50 to 100 contents) **Teaching Hours: 9 hrs**

MULTIMEDIA SYSTEM: Multimedia system architecture − Evolving technologies for multimedia − Defining objects for multimedia systems

Unit-4: (50 to 100 contents) **Teaching Hours: 9 hrs**

MULTIMEDIA FILE HANDLING: Multimedia data interface standards − Multimedia databases. Compression and decompression − Data and file format standards − Multimedia I/O technologies − Digital voice and audio − Video image and animation − Full motion video − Storage and retrieval technologies.

Unit-5: (50 to 100 contents) **Teaching Hours: 9 hrs**

HYPERMEDIA: Multimedia authoring and user interface - Hypermedia messaging -Mobile messaging − Hypermedia message component − Creating hypermedia message − Integrated multimedia message standards − Integrated document management − Distributed multimedia systems

Text book:

1. Ze-Nian Li and Mark S Drew, “Fundamentals of Multimedia”, Pearson Prentice Hall, 2004.
2. Tay Vaughan, “Multimedia: Making It Work”, 7th Edition, Tata Mc-Graw Hill, 2008.
3. John F.Koegel Buford,” Multimedia Systems”, Pearson edition, 2003.

Reference Book:

1. Prabhat K Andleigh, Kiran Thakrar, “Multimedia systems design”, PHI, 2007.
2. Daniel Cunlife and Geoff Elliot, “Multimedia Computing”, Lexden Publishing Limited, 2005.
3. Jennifer Burg, “The science of digital media”, Prentice Hall, 2009.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S			M						
CO2										
CO3										
CO4										
CO5										

CORE PRACTICAL IV

COMPUTER GRAPHICS AND WEB DESIGNING LAB

Semester: VI Paper type: Practical

Paper code:

Name of the Paper: COMPUTER GRAPHICS AND WEB DESIGNING LAB

Credit:2

Total Hours per Week:2 Lecture Hours: ….. Tutorial Hours: ….. Practical Hours: …..

……

Course Objectives

1. Apply the practical knowledge of the basic fundamentals of Graphics primitives

2. Effective application creations in the 2D Geometric transformations

3. Effective application creations in Image Editing and manipulation.

4. Effective applications in web page design using fundamental tools

5. Effective creation of web pages with lists, tables, frames and form validation.

Syllabus

1. Implementation of Algorithms for drawing 2D Primitives - Line (DDA, Bresenham)

2. Implementation of Algorithms for drawing 2D Primitives – Circle (Midpoint)

3. Implementation of 2D Geometric transformations

    2.1 Translation

    2.2 Rotation

    2.3 Scaling

    2.4 Reflection

    2.5 Shear

4. Image Editing and Manipulation - Basic Operations on image using any image editing software.

5. Write HTML code to create a Web Page that contains an Image at centre.

6. Create a web page with an appropriate image towards the left hand side of the page, when user clicks on the image another web page should open.

7. Create web Pages using Anchor tag with its attributes for external links.

8. Create a web page for internal links; when the user clicks on different links on the web page it should go to the appropriate locations/sections in the same page.

9. Write a HTML code to create a web page with yellow colour background and display moving message in red colour.

10. Create a web page, showing

10.1. An ordered list of all second semester courses (Subjects).

10.2. An unordered list of names of all the Programmes (Branches) in your institution.

10.3. Create a HTML document containing a nested list showing a content page of any book.

11. Create the following table in HTML with Dummy Data:

Reg. Number	Student Name	Year	Course Name

12. Create a web page which divides the page in two equal frames and place the audio and video clips in frame-1 and frame-2 respectively.

Frame 1	Frame 2

13. Write a function in java script that takes a string as an input and reverse the string as an output.

14. Create a simple dynamic web page and implement form validation.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S			M						
CO2										
CO3										
CO4										
CO5										

INTERNAL ELECTIVE

PAPER – 2

A. DATA ANALYTICS WITH R MANAGEMENT

Semester:VI **Paper type: InternalElective**

Papercode:Paper-2 **Title of the Paper: Data Analytics with R MANAGEMENT**
Credit:03

Total Hours perWeek: 03 **LectureHours:01** **TutorialHours:02** **Practical Hours:01**

……

Course Objectives

1. To understand the basics of R and its basic features.
2. To learn to carry out Exploratory Data Analytics.
3. To realize the power of visualization packages in R for effective reporting.
4. To create awareness on the uses of variables and relationships for visualization inR.
5. To prescribe the types of data used for data insights and inferences.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

a) Install and work with R.

b) Demonstrate the uses of various elements like variables and functions

c) Access data from other packages and databases

d) Import and export data between various sources.

e) Apply these functions for a real time problem

2. After studied unit-2, the student will be able to…..

a) Install and work with R.functions.

b) Clean data for data analytics.

c) Demonstrate string manipulations using R.

d) Use packages in R for visualization.

3. After studied unit-3, the student will be able to…..

a) Implement various types of plots.

b) Apply various types of charsts in R.

c) Work on data preparation for visualization.

d) Embedd R chunks for labelling.

e) Compile and configure R packages.

4. After studied unit-4, the student will be able to…

a) Demonstrate the methods of understanding outliers.

b) Perform one variable and two variable analyses.

c) Demonstrate the application of correlation and condition means.

d) Analyze the diamond dataset for prize prediction

5. After studied unit-5, the student will be able to…..

a) Explain the different types of data such as categorical, binary, ordinal and nominal ddata.

b) Differentiate discrete and continuous data.

c) Compare to apply the measures of central endency.

d) Apply the variability measures such as variance, range, standard deviation.

e) Demonstrate the power of visualization using box plot.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit-1: (50 to100 contents) **TeachingHours:12**

R BASICS

Introduction: What is R-Downloading and Installing R-. Getting Data into R: First Step in R:Typing in Small Datasets - Concatenating Data with c Function - Combining Variables with the c, cbind, rbind Functions - Vector Function - Matrix - Ddata frame - List-ImportingExcelData-AccessingDatafromotherStatisticalPackages-Accessing the Database. Functions - The Attach Function - Exporting Data - The TapplyFunction

-TheSupplyandLapplyFunction-TheSummaryandTableFunction.ImportingData - Csv, Excel, Table, Xml, Json, Databases Conditional - Control flow - Loops- A Function with Multiple Arguments.

Unit-2: (50 to100 contents) **TeachingHours:12**

EXPLORATORY DATA ANALYTICS

Cleaning Data: - Exploring raw data -Missing values - Zeros and NAs - Separating - Uniting Columns - String Manipulation - Filling Missing values - Packages - R Visualization Packages - Lattice - ggplot2 -Plotly, seaborn.

Unit-3: (50 to100 contents) **TeachingHours:12**

VISUALIZATION PACKAGES

Understanding plots - aesthetics - statistical function - Histogram - Box Plot - Density Plot-ScatterPlotsThePlotFunction-AddingaSmoothingLineThePieChart-TheBar and Strip Chart - Box Plot - Cleveland Dotplots- Reporting- Data Preparation - Embedding R chunks - Labelling and reusing code chunks - Report Compiling - Configuring - R Packages - shiny -Flex –ggvis.

Unit-4: (50 to100 contents) **TeachingHours:12**

VISUALIZATION: UNIVARIATE AND MULTIVARIATE ANALYSIS

VariableAnalysis-Onevariable-Understandingoutliersthrough-histogram,boxplot, density plot - dataset - pseudo dataset of facebook Exploring two variables - Understanding Variables and relationships - scatter

plots - correlations - condition means - Explore multivariate variables - Visualization of variables using aesthetics inR

- Case study - Explore Diamond dataset for prize prediction.

Unit-5: (50 to100 contents) **Teaching Hours:12**

CATEGORICAL AND NUMERICAL DATA INSIGHTS & INFERENCES

Data types - Categorical - Binary - ordinal - Nominal - Continuous - Discrete - Data Dimensions - Univariate - bivariate - multivariate - Numerical Measures - Central Tendency - Mean - Median - Mode - Understanding data using central tendency - plottinghistogram-densityplotsandinferenceofplot-VariabilityMeasure-Variance

-Range-IQC-andStandardDeviation-Sumofsquares-SquaredDeviations-Absolute Deviations - Identify outlier using Inter Quartile Range - Visualization using boxplot.

Text book:

1. R.Kolkota and A.B.Whinston: Frontiers of Electronic Commerce, New Delhi, AddisionWesley,1996.
2. Dr.P.Rizwan Ahmed, [2015], E-Commerce and E-Business, MarghamPublications, Chennai.
3. The Complete E-Commerce Book: Design, Build & Maintain a Successful Web- based Business Paperback - Import, 30 Mar 2004 byJaniceReynolds

Reference Book:

1.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S			M						
CO2										
CO3										
CO4										
CO5										

INTERNAL ELECTIVE

PAPER – 2

B. FUNDAMENTALS OF BIOLOGICALSCIENCES

UNIT- I

Microbial world: Structure of bacteria, virus and alchae, Environmental and industrial application of microbes. Food microbiology - food spoilage, food preservation and fermentation.

UNIT - II

Classification and morphology of plant: Outline of Classification of Major plant communities. General morphology of fungi, bryophytes, pteridophytes, gymnosperms and angiosperms and their adaptations.

UNIT - III

Animals kingdom: Classification of invertebrates and vertebrates. Characteristics and morphological adaptations of the invertebrates and vertebrates.

UNIT - IV

Study of cells using microscopes, structural organization of cells-nucleus, mitochondria, endoplasmic reticulum, golgi apparatus, lysosomes and peroxisomes etc. and their function. Cell division.

UNIT - V

Fundamental of genetics, mendelian inheritance, mutation. Theories of origin of life - organic evolution, speciation, Chromosomal manipulation.

TEXT BOOKS:

1. Dutta, A.C(1995) “Botany for degree students. Oxford University Press,Chennai.
2. Reha Mathur, (1994) “Animal Behaviour”, Restrogi & Company,Merrut.

3. Ready, S.M.[2004]"Microbial Biotechnology". Panima Book Publishing Company, NewDelhi.

REFERENCES

1. Ce Robertis, EDP and EMF De Roberties, [1996] "Cell and Molecular Biology". B.I.Waverly
   Pvt. Ltd., New Delhi.
2. Prescott et al.,[1999] "microbiology", MC Graw Hill, NewDelhi
3. Stebbins, G.L.,[1979] "Process of organic evolution". Prentice Hall of India, New Delhi.

WEB RESOURCES

1. http://www.netsci.org
2. http://www.animalword.net.in
3. http://www.biodive.org

C. OPERATING SYSTEMS

UNIT – I

Introduction: Definition of Operating system - Functions of operating system - History of Operating system - Types of Operating system - System calls and system programs.

UNIT - II

Process Management: Definition of Process - Process states - process state transition - Operations on Process - Process control block - Inter process Communication - Deadlocks.

UNIT - III

Memory management: Single and Multiple partitioned allocation - Paging - Segmentation - Virtual Memory Management - Demand paging and page replacement algorithms.

UNIT - IV

Information Management: File concept - Access methods - Directory structure - Allocation methods- free space management- disk scheduling.

UNIT - V

Unix Operating System: Structure of Unix Operating System - Shell and Kernel of Unix O/S -Files system - simple commands: ls, cp, rm, who, mkdir, cd, rmdir, more, lp, wall, mail etc

TEXT BOOK

1. Abraham Silberschatz and P.B. Galvin - Operating System Concepts - Addison Wesley Publication

INTERNAL ELECTIVE

PAPER – 3

A. HUMAN RESOURCE MANAGEMENT

UNIT – 1

Nature and scope of HRM - personnel Management and HRM - Functions of HRM - Functions of HR Manager - HRM as a profession - Indian perspective.

UNIT - II

Human Resource Planning - Recruitment - Selection - Methods of Selection - Use of Various tests - Interview techniques in selection -Placement.

UNIT - III

Induction - Training methods - Techniques - Identification of training needs - Training and Development.

UNIT - IV

Job satisfaction - Motivation (Maslow's and Two Factor Theory only) - Performance Appraisal - Methods - Compensation - Incentives - Monetary and Non-Monetary.

UNIT - V

Transfer - Promotion and Termination of Services - Career Development - Monitoring.

REFERENCE BOOKS:

1. Aswathappa- Human Resource and PersonnelManagement.
2. Memoria CB - PersonnelManagement.
3. Decenzo / Robbins - Human ResourceManagement.
4. Jayasankar - Human ResourceManagement.
5. C.B. Gupta - Human ResourceManagement.
6. L.M. Prasaad - Human Resource Management

B. NFORMATION SECURITY

Semester: IV Paper type: Internal Elective

Paper code: Name of the Paper: Information Security Credit: 3

Total Hours per Week: 03 Lecture Hours: 03 Tutorial Hours: …. Practical Hours: ---

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Course Objectives

1. To provide fundamental knowledge about basics of Information Security
2. To provide students with skills in certain aspects of basics of Information Security.
3. To Understand the professional issues in Information Security.
4. To identify various aspects of risk management and protocols, as well as to investigate various Security inside a network.
5. Familiarity with basic technological aspects of Information Security and how they might be utilised in various design and implementation

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to acquire knowledge in Security Systems

2. After studied unit-2, the student will be able to understand Risk Control Strategies.

3. After studied unit-3, the student will be able to know the Security Education.

4. After studied unit-4, the student will be able to understand Intrusion Detection System

5. After studied unit-5, the student will be able to use Cryptographic Tools and Security

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	No	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	No	Yes	No	Yes
5	Yes	Yes	No	No	No	Yes

Unit-1: **Teaching Hours: 5**

INTRODUCTION: History, What is Security, CNSS Security Model, Components of an Information System, Balancing Information Security and Access, The Systems Development Life Cycle, The Security Systems Development Life Cycle. Communities of Interest-Need for Security: Threats, Attacks

Unit-2: **Teaching Hours: 5**

LEGAL, ETHICAL AND PROFESSIONAL ISSUES: Law and Ethics in Information Security, International Laws and Legal Bodies, Ethics and Information Security, Codes of Ethics and Professional Organizations Risk Management: An Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control Strategies, Selecting a Risk Control Strategy

Unit-3 **Teaching Hours: 5**

PLANNING FOR SECURITY: Information Security Policy, Standards and Practices, The Information Security Blueprint, Security Education, Training and Awareness Program, Continuity Strategies

Unit-4: **Teaching Hours: 5**

SECURITY TECHNOLOGY: Firewalls and VPNs- Intrusion Detection and Prevention Systems, Honeypots, Honeynets and padded cell systems -Scanning and Analysis Tools- Bio metric access control.

Unit-5: **Teaching Hours: 5**

CRYPTOGRAPHY: Cipher Methods, Cryptographic Algorithms, Cryptographic Tools, Protocols for secured Communication-Attacks on Cryptosystems.

Text book:

4. Principle of Information Security, Seventh Edition, by Michael E. Whitman and Herbert J. Mattord, Cengage Publication.

Reference Book:

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", 4th Edition, Course Technology, Cengage Learning.

2. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol. 1-3 CRC Press LLC, 2008.

3. Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGrawHill, 2003

4. William Stallings, "Cryptography and Network Security", Pearson Education, 2000.

5. Nina Godbole, "Information Systems Security", Wiley-2009.

6. Information Security Fundamentals, Second Edition , by Thomas R.Peltier, CRC Press, Taylor & Francis Group

Course Material: website links, e-Books and e-journals

1. https://www.educause.edu/focus-areas-and-initiatives/policy-and-security/cybersecurity-program/resources/information-security-guide/toolkits/developing-your-campus-information-security-website

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	M	S	S
CO2	M	S	M	S	M	M	M	M	S	S
CO3	S	M	S	M	S	M	M	S	M	S
CO4	M	S	S	S	M	S	M	M	S	M
CO5	S	S	M	M	M	M	S	M	S	S

C. INDUSTRY 4.0 – ARTIFICIAL INTELLIGENCE

Course code	**INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE APPLICATIONS(Reference)**	**L**	**T**	**P**	**C**
Core/Elective/Supportive	Core / Elective	**4**		**0**	**4**
Pre-requisite	**Nil**	**Syllabus Version**			

Course Objectives:

The main objectives of this course are to:

1. To introduce Artificial Intelligence in detail from its basics to future applications and tools of Industry 4.0
2. To provide insights on technological advancements and focuses on preparing students and

researchers for Industry 5.0
3. To impart the importance of AI technologies in assistive technology
4. To discuss the available applications of AI for promoting early diagnosis of diseases
5. To understand the various AI technologies

Unit:1 Artificial Intelligence Insight 12-- hours

Artificial Intelligence: What and Why (1-1.2) – History of AI (1-1.3) – What is AI – The Basics (5-5.1.1) - AI Environment (1-1.5) - Challenges in AI (1-1.8) – Current work in AI for environment (3-3.1) – Customer Experience (CX) and the use of AI (5-5.2) – Future of AI (5-5.6) – Future challenges in AI (7-7.5)

Unit:2 Influence of AI in Machine Learning 12-- hours

Definition (14-14.1) – What is Machine Learning (14-14.2) - Importance of Machine Learning (14-14.1.2) – Types of Machine Learning (14-14.3) – Approaches of Machine Learning (17-17.2) - Machine Learning Algorithm (14-14.4) – Programming Languages (14-14.5.1) – Frameworks (14-14.5.2) – Databases (14-14.5.3) – Deployment tools (14-14.5.4) – Methodology for Model Building (16-16.2) – Machine learning methods (16-16.6) – Statistical Measures (16-16.7) - Application areas of Machine Learning (14-14.6) – Medical Machine Learning (17-17.4) – Influence of AI and ML in Clinical and Genomic Diagnostics (17-17.5)

Unit:3 Artificial Intelligence in Healthcare sector & Assistive Technology (AT) 12-- hours

AI in diagnosis of Genetic Diseases (8-8.4) – Cancer (8-8.4.1) – Diabetes (8-8.4.2) – AI in Diagnosis of Syndrome (8-8.5) – AI in diagnosis of Psychiatric Disorders (8-8.6) – Depression (8-8.6.1) – Alzheimer's Disease (8-8.6.2) – Autism Spectrum Disorder (8-8.6.3) – Anxiety (8-8.6.4) – Parkinson's Disease (8-8.6.5) – AI in other Diagnosis (8-8.7) – Infectious Disease (8-8.7.1) – Lung and Brain Disease (8-8.7.2) - Case studies on AI in systems Biology (7-7.4) – AI technologies in Systems Biology towards Pharmacogenomics (7-7.4.1) – AI in Systems Biology for Cancer Cure (7-7.4.2) – Applications of AI for COVID-19 Pandemic (7-7.4.3) - Transformative impact of AI on AT (13-13.3) – AI experience and AT for disables people in India (13-13.5) – AI Powered technology for an inclusive world (13-13.6)

Unit:4 Artificial Intelligence in Agriculture (10) 12-- hours

Need of AI in Agriculture (10-10.3) – Emerging Agricultural Technologies (10-10.4) – Soil and water sensors (10-10.4.1) – Weather Tracking (10-10.4.2) – Satellite Imaging Agriculture (10-10.4.3) – Automation Systems (10-10.4.4) – RFID Technology (10-10.4.5) – Potential Agricultural Domain for Modernization (10-10.5) – AI transformation in Agricultural Scenarios (10-10.6)

Unit:5 Artificial Intelligence in Radiotherapy (6) 12-- hours

Importance of Artificial Intelligence in Radiotherapy (6-6.2) – AI tools for automated treatment planning (ATP) (6-6.3) – Present ATP techniques (6-6.3.1) – AI applications, Advancements and Research Guidance in ATP (6-6.3.2) – AI challenges in ATP (6-6.3.3) – AI in Intensity modulated

Radiotherapy (IMRT) (6-6.4) – AI for IMRT Dose Estimation (6-6.4.1) – AI for IMRT Planning Support (6-6.4.2) – AI for Modeling IMRT outcome and plan deliverability (6-6.4.3) – AI for AUTO-Segmentation of OAR in IMRT (6-6.4.4) – AI in Brachytherapy (6-6.5) – AI in Radiotherapy Quality Assurance (6-6.6) – Challenges associate with AI for Quality Assurance in RT (6-6.6.4) – Future directions to improve AI-based Quality Assurance in RT (6-6.6.5) – AI in Radiation Biology (6-6.7) – AI in Radiation Protection/Safety (6-6.8) – Motivations to develop AI-Based systems for Radiation protection (6-6.8.1)

Total Lecture hours 60-- hours

Reference Book

1 Kaliraj, P., & Devi, T. (Eds.). (2021). Artificial Intelligence Theory, Models, and Applications (1st ed.). CRC Press, Taylor & Francis Group, Boca Raton, ebook ISBN 9781032008097 Auerbach Publications. https://doi.org/10.1201/9781003175865

D. INDUSTRY 4.0 – BIG DATA APPLICATIONS

Course code	**INDUSTRY 4.0: BIG DATA APPLICATIONS** (Reference Book Chapters)	**L**	**T**	**P**	**C**
Core/Elective/Supportive	Core	**4**			**4**
Pre-requisite	**Nil**	**Syllabus**			

Version

Course Objectives:

The main objectives of this course are to:

1. To understand the need of Big Data for Industry 4.0 transformation
2. To understand the importance of data integration service providers
3. To analyse Big Data infrastructure for effective online teaching and learning
4. To discuss the role of Big Data in various fields
5. To provide Big Data scope into different application areas

Unit:1 Introduction to Big Data Analytics and Data Science 12-- hours

Data: Terminologies (5-5.1.1) – Data Evolution (5-5.1.2) - Data Formats and sources (5-5.1.2.2) - Big Data Analytics (5-5.1) - Big Data concepts (4-4.2) - Big Data Components (5-5.2) – Big Data Characteristics (5-5.2.1) – Big Data vs. Statistics vs. Data Mining (5-5.1.3.3) – Big Data Approaches (13-13.1.3) - Data Lifecycle (13-13.2) - Data Science: A Definition (1-1.1.1) – Data Analysis (5-5.1.3.2) - Data Analytics types (1-1.1.3) - Data in the business (1-1.1.2) - Data Analytics Process, Implementation and Measurement (1-1.1.5)

Unit:2 Data Integration and Big Data Systems 12-- hours

Data Integration (2-2.2) – Data Integration Solutions (2-2.3) – ETL (2-2.3.2.1) – Data Integration Methodologies (2-2.4) – Big Data Processing: Architecture (5-5.2.2) – Traditional vs Big Data Framework (5-5.2.2.1) – Big Data related technologies (5-5.2.3) – Big Data Industry 4.0 Applications (5-5.2.4)

Unit:3 Business Statistical Methods for Big Data Analytics 12-- hours

Statistical methods and analytics techniques used across business (1-1.5) – Statistical methods and analytics techniques used in sales and marketing (1-1.6) – Data types generated in sales and marketing function (1-1.6.1) – Statistical Methods and Analytical Techniques (1-1.6.2) – Statistical Methods and Analytics Techniques used in Supply Chain Management (1-1.7) – Analytics use case in SCM (1-1.7.2)

Unit:4 Big Data for Education 4.0 12-- hours

Education 4.0 in India (10-10.6) - Digital Revolution of Education 4.0 (8-8.2) – Education 4.0 (8-8.2.1) – Requirements of Education 4.0 in Industry (8-8.2.2) – Benefits of Education 4.0 for Business Sector (8-8.2.3) – Influence of Industrial Revolution 4.0 on Higher Education (8-8.2.4) – Conceptual Framework of Big Data for Industry 4.0 (8-8.3) – Need for Big Data Analytics in Education (10-10.2)

Unit:5 Applications using Big Data and Business Analytics 12-- hours

Big Data Analytics and Business Analytics: An introduction (8-8.1) – Business Analytics (8-8.4) – Business Analytics vs. Business Intelligence (8-8.4.1) – Business Intelligence (8-8.4.1.2) – Challenges of Big Data and Business Analytics (8-8.6) – Applications of Big Data (8-8.5) – Big Data Analytics in Finance Industry (9-9.4) – Applications of Big Data Analytics in Education (10-10.3) – Big Data in Biomedical Research (13-13.4) – Applications in Biomedicine (17-17-4) – Applications in Healthcare

(17-17.5) – Big Data Use case: Warehouse Management and Supply Chain (5-5.4.2) – Automobile in Industry (5-5.4.2.2) – Pharmaceuticals (5-5.4.2.3) – Sport Analytics (5-5.4.2.4)

Total Lecture hours 60-- hours

Reference Book

1 Kaliraj, P. Devi, T. (2022). Big Data Applications in Industry 4.0 (P. Kaliraj, Ed.) (1st ed.). Auerbach Publications. https://doi.org/10.1201/9781003175889

E. INDUSTRY 4.0 – AUGMENTED REALITY

Course code	INDUSTRY 4.0: AUGMENTED REALITY (Reference Book Chapters)	L	T	P	C
Core/Elective/Supportive	Core	4			4
Pre-requisite	Nil	Syllabus Version			

Course Objectives:

The main objectives of this course are to:

1. To understand the importance of augmented reality in Industry 4.0 with real-time examples
2. To describe the history and recent developments of AR
3. To provide the need on emerging technologies AR and VR
4. To discuss the revolution and impact of AR
5. To understand the applications of AR and VR

Unit:1 Introduction to Augmented Reality 12-- hours

History of AR (4-4.2.1) - Augmented reality characteristics (1-1.1.1) – Difference between Augmented Reality and Virtual Reality (1-1.1.2) – AR technological components (1-1.2.1.1) – Technologies used in AR– Feature Extraction (1-1.2.2) – Hardware components (1-1.3) – AR devices (1-1.3.3) – Importance of AR (2-2.2.1) - Real world uses of AR – AR types (2-2.2.2) – Software tools available for AR (1-1.5)

Unit:2 Need of technologies for Augmented Reality 12-- hours

Hardware technology (5-5.4) – virtual scenes (5-5.4) – 3D objects (5-5.4) – AR components (5-5.4.1) – Display (5-5.4.2) – HMD – Eyeglasses (5-5.4.4) – Contact Lenses(5-5.4.5) – significance of AR(5-5.5) – AR powered devices (7-7.4)– AR application development drawbacks (7-7.4) – Compatibility – Performance (7-7.4) – AR libraries (7-7.6) – Motion tracking (7-7.7) – Environmental understanding – Anchors (7-7.8)

Unit:3 Technology Integration and Implementation of AR 12-- hours

Technology use and integration in industrial settings (5-5.6) – Assistive training to faculty members (5-5.7) – Planning and administration for implementation (5-5.8) – AR implications (5-5.8.1) – Practical data– AR labs (5-5.8.2) – Platforms to form AR content (5-5.10.2) – Coordinated utilization of AR applications – Hands-on preparation (5-5.11)

Unit:4 Augmented Reality and Virtual Reality for Micro Learning 12-- hours

Micro learning techniques (5-5.11 [9]) – Utilizing VR for learning – VR for Practical online assessment (5-5.11 [9 A])– VR info graphics (5-5.11)– Virtual case considerations (5-5.11) - Utilizing AR for learning (4-4.4) – Accessible learning (5-5.12) – sensible data (5-5.12) – elevated learner engagement (5-5.12) - VR technology (2-2.3) – Components of VR (2-2.3.1) – VR Hardware (2-2.3.2) – VR applications (2-2.3.3) – Civil Engineering (2-2.3.3) – Real Estate (2-2.3.3) – Biology and

Medicine (2-2.3.3) – Virtual Mall (2-2.3.3) – VR in Education (2-2.3.3) – Virtual Laboratory – Factory Planning – Automobile Industry (2-2.3.3)

Unit:5 Tools and Applications of Augmented Reality 12-- hours

Tools available for Augmented Reality and Recognition (1-1.5) – Software Tools (1-1.5.1) – Google Poly – Unity – software approaches – recognition types (1-1.5.2) – native software solutions (1-1.5.2.1) – ARKit (7-7.6) – ARCore (7-7.6, 7.10.3) – software development kit - Cloud services - AR business applications (1-1.4) – weather prediction (1-1.4.2) – market prediction (1-1.4.3) – smart cities (1-4.4) - AR application for Education (4-4.3) - AR application for Healthcare sector (8-8.3) – Agriculture – Civil Engineering – Architecture – Archaeology – Crime and Security (2-2.2.7) – Games (6-6.2) – IoT (8-8.3.3) – Use cases (7-7.9) – Social Media (7-7.9.1) – Gaming (7-7.9.2) – Education (7-7.9.3) – Healthcare (7-7.9.4) – Shopping and Business (7-7.9.5)

Total Lecture hours 60-- hours

Reference Book

1 Kaliraj P, Devi T, (2021). Innovating with Augmented Reality: Applications in Education and Industry (P. Kaliraj, Ed.) (1st ed.). Auerbach Publications. https://doi.org/10.1201/9781003175896