

B.Sc. (Computer Science - Honors)

CURRICULUM AND SYLLABUS - 2021



KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION (Under Section 3 of the UGC Act 1956) Anand Nagar, Krishnankoil-626126 Srivilliputtur(via); Virudhunagar(Dt.), Tamil Nadu, INDIA (www.kalasalingam.ac.in)

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

VISION

To become a Center of excellence offering quality education and innovation in Computer Science and Information Technology.

MISSION

To prepare the students to excel in the field of Computer Science and IT industry. To prepare the students to pursue higher studies and develop sustainable innovative solutions for the society.



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DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

B.Sc (Computer Science - Honours)

Programme Educational Objectives (PEOs)

PEO 1	Graduates of the program will become technically competent to pursue higher studies.
PEO 2	Graduates of the program will utilize modern and advanced technological tools for performing Investigation, analysis and synthesis by identifying various computer solutions.
PEO3	Graduates of the program will collaborate with multi disciplinary teams and will be able to become leaders in their organization, their profession and in society.

Programme Outcomes (POs)

- PO1: Ability to apply knowledge in mathematics, science fundamentals to solve problems.
- **PO2:** Ability to use a range of programming languages and tools to develop computer programs to solve problems effectively.
- **PO3:** Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
- PO4: Ability to communicate effectively in both verbal and written form in industry and society.
- **PO5:** Ability to work in teams to build software systems and apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks
- **PO6:** Ability to select appropriate techniques to tackle and solve problems in the discipline of information security management.
- PO7: Understand the basic concepts of system software, hardware and computer graphics.

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

B.Sc. (Computer Science - Honours)

COURSE STRUCTURE

Programme / Credit-wise Distribution:

S.No	Course Category	Credits	
Ι	Foundation Core	30	
II	Programme Core	70	
II	Program Elective		20
11	Discipline specific elective	24	30
	Skill Enhancement Courses	06	
IV	Experimental Elective		10
	Total Credits		140

Department of Computer Science & Information Technology

B.Sc. (Computer Science- Honors) Programme

(Those who joined 2021 onwards)

Scheme of Instruction

Course Code	Course Name	Туре	L	Т	Р	X	С	Н
211ENG1302	English I	FC	4	0	0	3	5	7
211MAT1304	Basic Statistics	FC	2	0	0	3	3	5
211CAS1301	Digital Skills [IC-T]	FC	3	0	2	3	5	8
212BCS1301	Python Programming [IC-T]	PC	5	0	2	0	6	7
213BCS3***	DSE – 1	PE	4	0	2	0	5	6
212BCS1201	Introduction to Worksheet	PC	0	0	4	0	2	4
211ENG1303/ 211TAM1301/ 211HIN1301	English II/ MIL	FC	3	0	0	3	4	6
212BCS2101	Linear Algebra & Calculus	PC	4	0	0	0	4	4
212BCS2305	Data Structures & Algorithms [IC]	PC	4	0	2	0	5	6
212BCS1303	Programming Methodologies [IC]	PC	4	0	2	3	6	9
213BCS3***	DSE-2	PE	4	0	2	0	5	6
215BCS4201	Industrial Training	EE	0	0	4	0	2	4
211CHY1101	Environmental Studies	FC	3	0	0	0	3	3
211ENG1306	Communicative English	FC	3	0	2	3	5	5
212BCS2301	Operating Systems [IC]	PC	4	0	2	0	5	6
212BCS2309	JAVA Programming [IC]	PC	4	0	2	3	6	6
213BCS3***	DSE-3	PE	4	0	2	0	5	6
212BCS2202	Web Programming Lab	PC	0	0	4	0	2	4
211ENG1304	Human Values	FC	2	0	0	3	3	5
211ENG1305	Professional Skills	FC	1	0	0	3	2	4

Course Code	Course Name	Туре	L	Т	Р	X	С	Н
212BCS2304	DBMS[IC]	PC	4	0	2	0	5	6
212BCS2306	Computer Networks [IC]	PC	4	0	2	0	5	6
212BCS2121	Process Management	PC	3	0	0	0	3	3
213BCS3***	DSE-4	PE	4	0	2	0	5	6
212BCS2115	Virtualization Techniques	PC	4	0	2	0	5	6
212BCS2116	Object Oriented System Development	PC	4	0	0	0	4	4
212BCS2117	Introduction to Digital Technologies	PC	4	0	0	0	4	4
212BCS2118	Human Computer Interaction	PC	4	0	0	0	4	4
213BCS3***	DSE-5	PE	3	0	2	0	4	5
212BCS2311	Campus to Corporate	PC	1	1	2	0	2	4
212BCS2213	Multimedia Lab	PC	0	0	4	0	2	4
214BCS4***	SEC -I	PE	0	0	4	0	2	4
214BCS4***	SEC-2	PE	0	0	4	0	2	4
214BCS4***	SEC-3	PE	0	0	4	0	2	4
215BCS4203	Project Work	EE	0	0	12	0	6	12
215BCS4202	Internship	EE	0	0	0	0	2	

S.No	Subject	Courses	Credits
	Code		
	213BCS3119	Practical Approach to Data Mining &	5
DSE - I		Analytics	
(1 st sem)	213BCS3120	Artificial Intelligence for Real World	
		Application	
	213BCS3121	Information Security – Practioner's	
		Perspective	
	213BCS3122	Data Modeling & Visualization	5
DSE – II	213BCS3123	Machine Learning for Real - World	
(5th sem)		Application	
	213BCS3124	Practical Approach to Cyber Security	
	213BCS3125	Application Deep Learning & Neural	5
DSE -III		Networks	
(3 rd sem)	213BCS3126	Data Analytics and Reporting	
	213BCS3127	Applied Cloud Computing	
DSE -IV	213BCS3128	Conversational Experiences	5
(4 th sem)	213BCS3129	Data Mining and Warehouse	
	213BCS3130	Advanced Cyber security - an advanced	
		Approach	
DSE -V	213BCS3131	Design Thinking	4
(5 th sem)	213BCS3132	Natural Language Processing	
	213BCS3133	Social Media and Text Analytics	

List of Discipline-Specific Electives:

Skill Enhancement Electives:

S.No	Subject Code	Courses	Credits
SE - I	214BCS3207	C# Programming	2
(5th sem)	214BCS3201	Software Testing Lab	2
SE – II	214BCS3203	.Net Programming	
(5th sem)	214BCS3204	Mobile Application Development Lab	2
SE -III	214BCS3208	Scripting Languages	2
(oth sem)	214BCS3206	Robotic Process Automation	2

211ENC1202		L	Т	Р	X	С
211ENG1302	ENGLISH - I	4	0	0	3	5
Course Category Course Type: Th	7: Foundation Core eory					

COURSE OBJECTIVE:

This course aims at facilitating the student to understand the nuances of English Language through poetry, literary essays, biographies of eminent personalities, short stories of renowned writers and Grammar.

COURSE OUTCOMES

At the end of the course the students will be able to

- CO1: To understand the fundamentals of Grammar
- CO2: To understand simple literary texts.
- CO3: To apply the reading skills and practice it.
- CO4: To develop the quality of practical application of Grammar
- CO5: To apply the conversation practice in day to day life.

UNIT I Poetry

The Umbrella Man; Television -Roald Dahl La Belle Dame Sans Merci - John Keats Homecoming -R.Parthasarathy Ulysses - Alfred Tennyson

UNIT II Prose

Bill Gates: A Biography - Michael B. Becraft I Dare! Kiran Bedi- Parmesh Dangwal My Autobiography- Charlie Chaplin Swami Vivekananda – Chicago Speech of 1893

UNIT III Short Stories

The Ballad of Father Giligan -W.B.Yeats The Conjurer's Revenge-Stephen Leacock Little Girls Wiser than Men-Leo Tolstoy

UNIT IV Grammar

Parts of the Speech Prefix, Suffix Idioms and phrases Sentence Pattern Tenses

UNIT V Composition Letter Writing, Email Writing Report Writing; Cover Letter and Resume Writing

Text

- Henderson, Archibald. George Bernard Shaw, His Life and Works: A Critical Biography; India:Wentworth Press (2016)
- Gupta, Prashant, *The Life and Times of Bill Gates*; Prabhat Prakashan Publications, 2020 **Reference Book**
- Sparkles English For Communication. Board of Editors, Emerald Publishers, 2015

21114 4 11204	DACIC STATISTICS	L	Т	Р	X	С
211MAT1304	DASIC STATISTICS	2	0	0	3	3
Course Category Course Type: Th	v: Foundation Core eory					

UNIT-I: Introduction to Probability

Definitions of Probability – Axioms on probability – Conditional probability (Simple problems on the above topics)

UNIT-II: Introduction to Statistics

Definition of Statistics – Scope and Limitations of Statistics – Statistical investigation – Stages in conducting survey – Primary data vs Secondary data – Classification, Tabulation and presentation of data diagram(Simple problems on the above topics)

UNIT-III: Measures of Central Tendencies

Measures of Central tendency definition; Types of averages, median, mode, Arithmetic mean, Geometric mean, Harmonic mean, Quadratic mean, Relation between mean, median and mode(Simple problems on the above topics)

UNIT-IV: Measures of Dispersion

Definition and properties of dispersion – Absolute vs relative measure of dispersion – Skewness, Kurtosis, Range, Quartile deviation, Mean deviation and Standard deviation(Simple problems on the above topics)

UNIT-V: Correlation and Regression

Introduction – Types of correlation – Coefficient of Correlation – Rank Correlation – Regression – Principles of least square techniques – Fitting a straight line – Fitting a second-degree parabola(Simple problems on the above topics)

TEXT BOOK(S)

- 1. Arumugam and Issac, Statistics, New Gamma Publishers, July 2013.
- 2. A.M. Goon. M.K.Gupta and B.Dasgupta Fundamentals of Statistics. Vol. I & II.

REFERENCE BOOK(S)

1. S.C Gupta- Fundamental of statistics- Himalaya publishing house- 2014.

TEXT BOOK(S)

- 3. Arumugam and Issac, Statistics, New Gamma Publishers, July 2013.
- 4. A.M. Goon. M.K.Gupta and B.Dasgupta Fundamentals of Statistics. Vol. I & II.

REFERENCE BOOK(S)

2. S.C Gupta- Fundamental of statistics- Himalaya publishing house- 2014.

211/CA \$1201	DICITAL SELLIS	L	Т	Р	X	С
211CAS1301	DIGITAL SKILLS	3	0	2	3	5
Course Category Course Type: Int	r: Foundation Core egrated course - Theory					

COURSE OBJECTIVE(S)

To make students aware of fundamentals of Computers, online file handling, Various application areas of Computers.

COURSE OUTCOMES

At the end of the course the students will be able to

CO1: Create and manipulate files and folders in windows and also in Google Drive

CO2: Apply various formatting features in Word, apply the skills to gather knowledge from internet.

CO3: Apply the various Operations on Electronic Spread sheets

CO4: Apply the various Operations on Power point presentations

CO5: Analyze the security issues in networks before using them

CO/P	PO	PO	PO	PO	PO	PO
0	1	2	3	4	5	6
CO1	М				S	
CO2		S		S		
CO3			S	S		
CO4				М	S	
CO5		S	М			S

UNIT I

12

Introduction to Computer & Basic Concepts - What is Computer-Concept of Hardware and Software-**Basics of Operating System**-Operating System Simple Setting: Changing System Date and Time, Changing Display Properties, To Add or Remove a Windows Component, Keyboarding features - Changing Mouse Properties, Adding and removing Printers – **DriveFile Organization**- Types of files, What is a file, Naming conventions, File Extensions, File Pathway, Windows Explorer, Viewing files, File property dialogue box, Explain file size (bytes, kilo, mega, giga, tera), Create a Folder, Move a file (multiple files)into a folder, Delete files and folders, Recovering deleted files, Renaming files, Searching for files, Creating and deleting shortcuts on desktop- How programs may save files in specific location by default- How to find where file is being saved – **Google Apps** – Drive, Docs, sheet, forms and Meet.

UNIT II

Digital communication - Digital Footprint Management, Online Communication and Collaboration, Public and Mass Communication **Various applications of Internet -** e-mail, information gathering, retailing etc -Methods of connecting to the Internet- Dial up, ISDN and broadband- Brief introduction to Internet addressing, Internet protocols (TCP/IP, FTP and HTTP,IPV4,IPV6) - Using Instant messaging, - Use of Social Networking Sites viz. Facebook, Twitter etc.. **Word Processing Basics**- Opening and closing Documents- Text Creation and manipulation- Formatting the Text - Formatting a document - Table Manipulation - Inserting Graphic Elements-Mail Merge.

UNIT III

Networking & Troubleshooting - Basic of Computer Networks- LAN, WAN, Wi-Fi, Broadband, Bluetooth-Internet -Concept of Internet, Applications of Internet, Connecting to the Internet, Troubleshooting- WWW, TCP/IP, DNS, ISP,URL, Search Engine - Key web browser features, Brief about switch, router, gateway - Elements of Electronic Spread Sheet - Manipulation of Cells - Formulas and Function Definition of e-Governance - Infrastructure for eGovernance - eGovernance project life cycle, electronically delivery of services - Railway Reservation, Passport, eHospital. Digital Rights - Privacy Management, Intellectual Property Rights Management, Participatory Rights Management. UNIT IV

Application of Digital Financial Services - Why savings are needed, Why save in a bank, Banking products-ATM card, Rupay Card, Banking Instruments-Cheque, Demand Draft (DD), Currency Notes, Banking Services Delivery Channels, Know Your Customer (KYC), Opening of bank account and documents required, Types of bank accounts, Bank's services including remittances, loan, mobile banking, Overdraft, Pension , NEFT, RTGS, IMPS etc., Types of Insurance, password security and ATM withdrawal - how digital signature works- **Basic Concepts ofPowerPointpresentation** - Creation of Presentation - Preparation of Slides - Presentation of Slides- Slide Show.**Digital Emotional Intelligence -** Digital Empathy, Self-Awareness and Management, Relationship Management

UNIT V

Cyber Security -Basic concepts of threats, security policies- security mechanisms- Data Security and protection- concept, creating strong passwords- how to stay safe when surfing on internet - identifying secure website, clear cookies - **identifying a secure web site**- https, lock symbol- Security Considerations- Know about security threats from web sites like: viruses, worms, Trojan horses, spyware. Understand the term malware- Netiquettes- Be aware of the possibility of receiving fraudulent and unsolicited e-mail; phishing, Recognize attempted phishing -Basics of Software Licensing.**Digital Safety** - Behavioral Cyber-Risk Management, Content Cyber-Risk Management, Commercial and Community Cyber-Risk Management.

Total Hours: 60

Text Books:

12

12

12

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С

- 1. Fundamentals of Information Technology, <u>Alexis Leon</u> & <u>Mathews Leon</u>, 2/e, Vikas Publishing,2009
- 2. Introduction to Computer Fundamentals and Information Technology, Copernicus P. PepitoMapua IT, CenterMakati Campus
- Microsoft Office 2016 Step by Step, Joan Lambert Curtis Frye, published by Microsoft Press, 2015
- 4.. Cyber security Fundamentals A Real-World Perspective, <u>Kutub Thakur</u>, Al Sakib Khan Pathan Published May 13, 2020 by CRC Press
- 5. Computer Fundamentals by Priti Sinha, Pradeep Sinha, BPB Publications, 6thEdition, 2003
- e-Governance Policy Initiatives under Digital India eBook , Department of Electronics and Information Technology, Ministry of Communications and Information Technology, Government of India.

212BCS1301

PYTHON PROGRAMMING

Pre-requisite: : Basic Knowledge in Programming **Course Category :** Program Core **Course Type:** Integrated Course - Theory

COURSE OBJECTIVES

The main objective of the course is to provide basic knowledge for solving problems using computers and to impart the necessary skills for the development of applications. This course enables the students to design an algorithmic solution to a problem, create and execute Python programs.

COURSE OUTCOMES

Upon the completion of this course, the students will be able to

CO1: Understand the programming basics.

CO2: To gain the knowledge about functions, string and list.

CO3: To learn how to read and write files in Python.

CO4: To learn how to use dictionaries and modules.

CO5: Understand the object-oriented program design and development.

		РО									
CO/PO	1	2	3	4	5	6	7				
CO1	S	S		L	L	L					
CO2	S		М	S	S						
CO3			L	S	S						
CO4	L	S	S	S	S						
CO5			L	S	S		М				

MAPPING OF COURSE OUTCOME(S)

Introduction to Python: Introduction-Python Overview-Comments-Identifiers-Reserved Keywords-Variables-Standard Data type-Operators-Statements and Expressions-String Operations-Boolean Expressions-Control Statements-Iteration Statements-Input from Keyboard.

UNIT –II

Function, String, Lists: Introduction-Built-in Functions-User defined Functions- Python Recursive Function- Writing Python Scripting. **Strings**: Introduction-String handling functions-String Formatting operator and functions-Lists: Value & Accessing Elements-Deleting elements from List-Built-in List Operators and methods

UNIT-III

Tuple, Files & Exceptions: Introduction-Creating Tuple – Accessing Tuple-Tuple Assignment – Tuple as Return Value-Basic Tuple Operations and Functions-**Files**: Text File:Opening a File-Closing a File-File Object Attributes-Writing to a File-Reading from a File-Renaming a File-Deleting a File. **Exceptions**: Built-in Exceptions-Handling Exceptions-Exception with arguments-User-Defined Exceptions.

UNIT -IV

Dictionaries and Modules: Creating a Dictionary- Accessing Values- Adding and Modifying an Item in a Dictionary- Modifying an Entry- Deleting Items- Sorting Items in a Dictionary- Looping over a Dictionary-Nested Dictionaries- Built-in Dictionary Functions and Methods- String Formatting with Dictionaries. **Modules**: The from...import statement- Name of Module- Making your own Modules- The dir() function- The Python Module- Modules and Namespaces.

UNIT –V

Classes & Objects: Introduction-class Definition-creating Objects-Objects as a Arguments-Object as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding.

Total: 60 Hours

TEXT BOOK:

- 1. Balagurusamy, "Introduction to Computing & Problem Solving Using Python", Mc Graw Hill Education, 2016.
- 2. Reema Thareja, "Problem solving and programming with Python", Oxford University Press, Second Edition, 2019.

REFERENCES:

- 1. Introduction to Python Programming. Gowrishankar S, Veena A. CRC Press, Taylor & Francis Group, 2019.
- 2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
- 3. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
- 4. Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist : learning with Python, Freely available online.2012.

12 Hours

12 Hours

12 Hours

HIII

12 Hours

LIST OF PROGRAMS

- 1. Write a program to swap two numbers
- 2. Write a program to find largest among given three numbers
- 3. Write a program to find the maximum of a list of numbers.
- 4. Write a function program to find sum of several natural numbers using recursion
- 5. Write a program to find duplicate characters in a given string.
- 6. Write a program to check whether a string is palindrome or not.
- 7. Write a program to remove punctuations from a string
- 8. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
- 9. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
- 10. Write a program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria: Grade A: Percentage >=80

Grade B: Percentage>=70 and <80

Grade C: Percentage>=60 and <70

Grade D: Percentage>=40 and <60

Grade E: Percentage<40

- 11. Write a program to transpose a matrix.
- 12. Write a python program to perform the linear search.
- 13. Write a python program to perform the binary search.
- 14. Write a program to find first n prime numbers.
- 15. Write a program to calculate the sum and product of two compatible matrices.
- 16. Write a program to catch on divide by zero exception. Add a finally block too.
- 17. Write a program to write data in a file for both write and append mode.
- 18. Find the most frequent words in a text read from a file.

Total: 15 Hours

212BCS1201	INTRODUCTION TO WORKSHEETS	L	Τ	P	X	C
212DC51201	INTRODUCTION TO WORKSHEETS	0	0	4	0	2
Course Category : Program Core						
Course Type: Practic	cal					

COURSE OBJECTIVES

This course helps the students to perform all sorts of tasks like budgeting, sales analysis, forecasting, charting, graphing.

COURSE OUTCOME(S)

CO1 : Develop applications using workbook and worksheet object

CO2: Implement worksheets using control statements and range function.

CO3 : Develop interactive applications using User form

CO4: Implement applications using functions and sub procedures

CO5: Handle worksheets using mathematical and financial functions.

MAPPING OF COURSE OUTCOME(S):

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	М	S	М	М	S	S
CO2	М	S	S	S	S	М
CO3	М	S	S	М	S	М
CO4	S	S	М	М	S	М
CO5	S	S	М	М	S	М

LIST OF PROGRAMS

45 Hours

- 1. Program to demonstrate Built in Dialog boxes.
- 2. Program to calculate total sales value of each employee over a period of three years in workbook and worksheet object.
- 3. Program to show print preview of all the possible cricket matches from a list of items using range function.
- 4. Program to compare randomly selected ranges and highlight cells that are unique using range function.
- 5. Program to calculate the tax on income

Income	Tax on this income
0 to Rs.2,00,000	Nil
Rs.2,00,000 to 4,00,000	10%
Rs,4,00,000 to 8,00,000	20%
Above Rs.8,00,000	30%

- 6. Program to create user form that converts any amount from one currency into another.
- 7. Program to demonstrate interactive user form.
- 8. Program to create a sub procedure to generate Fibonacci series up to 1000.
- 9. Program to demonstrate financial functions.
- 10. Program to demonstrate mathematical functions.

Total: 45 Hours

212ENC1202		L	Т	Р	X	C
212ENG1303	ENGLISH II /MIL	3	0	0	3	4
Course Categor	y: Program core					
Course Type: T	heory					

Week		Lecture	X- Activity		
	1	Nissim Ezekiel - Enterprise			
	2	Nissim Ezekiel - Enterprise	Discussion on the contribution of famous		
1	3	Kamala Das – The Dance of Eunuchs	Indian poets and the Tradition of Indian		
	4	Toru Dutt – Our Casuarina Tree	English Poetry (extempore)		
	5	Toru Dutt – Our Casuarina Tree			
2	6	Toru Dutt – Our Casuarina Tree	Enacting Monologues on Memories of		
2	7	Sri Aurobindo – <i>The Tiger and the Deer</i>	Childhood (extempore)		
	8	Sri Aurobindo – <i>The Tiger and the Deer</i>			
	9	B.K. Bhattacharya – The Golden Goddess			
	10	B.K. Bhattacharya – The Golden Goddess	Preparing a video on the Ethos of Typical		
3	11	B.K. Bhattacharya – The Golden Goddess	Indian Life (will be informed prior)		
	12	B.K. Bhattacharya – The Golden Goddess			
	1.0				
	13	Himanshu Vohra – A Member of the Family			
4	14	Himanshu Vohra – A Member of the Family	Should write an essay on a member of the		
	15	Himanshu Vohra – A Member of the Family	Tanniy (extempore)		
	16	Lalithambika Antharjanam – Daughter of Man			
	17	Lalithambika Antharjanam – Daughter of Man			
_	18	Lalithambika Antharjanam – Daughter of Man	Discussion: Glossary		
5	19	Lalithambika Antharjanam – Daughter of Man	Sterling qualities of Indian English Short		
	20	P.Lankesh – Bread	stories (will be informed prior)		
	21	DLankash Prood			
	$\frac{21}{22}$	PLankesh Bread	Extempore speech:		
6	22	Girish Karnad Hayayadana	Social Responsibility of People		
	$\frac{23}{24}$	Girish Karnad Hayayadana	Social Responsionity of reopie		
	24	Girish Karnad Hayayadana			
	$\frac{25}{26}$	Girish Karnad – Hayavadana	Ouiz on History of Indian Drama		
7	20	Girish Karnad – Hayayadana	The plays of Girish Karnad (should be		
	27	Girish Karnad – Hayavadana	prepared in advance)		
	29	Girish Karnad – Hayavadana	Discussion:		
	30	Girish Karnad – Hayayadana	Critical Review on Havavadana		
8	31	Girish Karnad – Hayayadana	Characterization. (extempore)		
	32	Girish Karnad – Hayayadana	characterization (entempore)		
	33	Girish Karnad – Hayayadana			
9	34	Girish Karnad – Hayayadana	Make parts of speech signs		
L	54	Onish Kanad – nayavadana	make parts of specch signs		

	35	Parts of Speech	Practice Parts of Speech Poem (will be
	36	Parts of Speech	informed prior)
	00		
	37	Articles	Fill in the Blanks with Suitable Articles
10	38	Sentence : Kinds, Types	Identify Kinds/Types of given sentences
10	39	Tense	Choose the correct Tense form (extempore)
	40	Tense	
	41	Tense	
	42	Reported Speech	Pairwork dictation match the dialogue
11	43	Reported Speech	pairs
11	44	Degrees of Comparison	Comparative and Superlative Flashcard
			Games (extempore)
	45	Degrees of Comparison	
	46	Conditional Clause	Practice to frame comparative statements.
12	47	Voice: Active, Passive	Subject-verb agreement practice in given
	48	Concord	sentences (extempore)
	10		
	49	Expansion of Proverb	
10	50	Letters	Students compose <i>letters</i> to their favourite
13	51	Letters	characters Prediction, Short Answer –
	52	Reading Comprehension	Practice (extempore)
	53	Cloze Test	Note-Making Practice (extempore)
	54	Precis Writing	
14	55	Note-Making	
	56	Writing Dialogues	
	57	Writing Dialogues	Creating an Agenda/ Practice and
	58	Notices	Writing model meeting minutes
15	59	Agenda	(extempore)
	60	Minutes	

212BCS2101 LINEAR ALGEBRA AND CALCULUS	L	Т	P	X	С	
2126052101	LINEAR ALGEBRA AND CALCULUS	4	0	0	0	4

Course Category: Program core Course Type: Theory

COURSE OBJECTIVES

This course will cover the analysis and implementation of algorithms used to solve linear algebra problems in practice. This course will enable students to acquire further skills in the techniques of linear algebra, as well as understanding of the principles underlying the subject.

At the end of this course, and having completed the Essential reading and activities, students

COURSE OUTCOME(S)

At the end of this course, and having completed the Essential reading and activities, students

CO1: Understand how to solve systems of linear equations, diagonalize matrices and characterise quadratic forms

CO2: Apply the knowledge to solve problems on vector space

CO3: Compute eigen values

CO4: Compute multivariate Differentiation

CO5: Compute multivariate integration

.Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1			S			
CO2		S			W	
CO3	Μ			S		
CO4			S			S
CO5		S		Μ		

Unit I

Systems of linear equations, Solution by Gauss elimination, row echelon form and rank of a matrix, fundamental theorem for linear systems (homogeneous and non-homogeneous, without proof), Eigen values and eigen vectors. Diagonalization of matrices, orthogonal transformation, quadratic forms and their canonical forms.

Unit II

Vector Space - dimensions - Linear combinations and span, spanning a vector space – Linear dependent - Subspace and Null –Space - problems based on these.

Unit III

Orthogonal matrics - their properties - Orthoginalization Methods-Matrix decomposition methods - Eigen Value Decomposition - Singular Value Decomposition

Unit IV

Concept of limit and continuity of functions of two variables, partial derivatives, chain rule, total derivative, Relative maxima and minima, Absolute maxima and minima on closed and bounded set.

Unit V

Double integrals (Cartesian), reversing the order of integration, Change of coordinates (Cartesian to polar), finding areas and volume using double integrals, mass and centre of gravity of inhomogeneous laminas using double integral. Triple integrals, volume calculated as triple integral, triple integral in cylindrical and spherical coordinates (computations involving spheres, cylinders).

Text Books

1. H. Anton, I. Biven, S. Davis, "Calculus", Wiley, 10th edition, 2015.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 10thEdition, John Wiley & Sons, 2016. Reference Books

- 1. J. Stewart, Essential Calculus, Cengage, 2nd edition, 2017
- 2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9 th Edition, Pearson, Reprint, 2002.
- 3. Peter V. O'Neil, Advanced Engineering Mathematics, Cengage, 7th Edition, 2012
- 4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- 5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

2120 (52205	S2305 DATA STRUCTURES & ALCORITHMS		Т	Р	X	C				
212BCS2305 DATA STRUCTURES & ALGORITHMS				2	0	5				
Course Categor	Course Category: Program core									
Course Type: In	ntegrated course - Theory									

COURSE OBJECTIVES:

The main objective of the course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures.

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to

- **CO1:** Analyze performance of algorithms and choose the appropriate data structure and algorithm design method for a specified application.
- **CO2:** Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs and Use various data structures effectively in application programs.
- **CO3:** Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- CO4:Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort and searching techniques
- CO5: Gain knowledge about Hashing and Collisions and B- Trees

				PO			
0/10	1	2	3	4	5	6	7
CO1			L	Μ			
CO2		S	М	Μ	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

MAPPING OF COURSE OUTCOME(S):

$\mathbf{UNIT} - \mathbf{I}$

Algorithmic notation – Programming principles – Creating programs- Analyzing programs - array – Representation of Arrays- One dimensional array- Multidimensional array- pointer arrays- Stack and Queue - Fundamentals of stack and Queues - Evaluation of Expressions

UNIT-II

Linked List: Single Linked List – Doubly Linked List – Circular Linked List- Application of Linked List-Dynamic Storage Management - Generalized List - Garbage Collection And Compaction

UNIT-III

Tree Introduction - Binary Tree Representation - Tree Traversal- Threaded binary Tree - AVL Tree- Heap-Definition, Insertion, Deletion, Graphs-Terminologies-Representation-Adjacency matrix and adjacency list - BFS, DFS traversals -Shortest Path Algorithm - Dijkstra's algorithm- Minimum Spanning Tree Kruskal algorithm, Prims Algorithm.

UNIT -IV

Bubble sort – Insertion Sort – Selection sort – Radix Sort - Shell Sort– Merge sort – Quick Sort – Heap Sort -Linear Search - Binary Search - Search Trees- Binary Search Trees. Red-Black and Splay Trees, **Comparison of Search Trees**

UNIT-V

12 Hours

12 Hours

20

12 Hours

12 Hours

12 Hours

Hashing – Types of Hashing – Collision Resolution techniques- B- Tree Representation – B tree Operations-B+ Tree Indexing

TOTAL : 60 Hrs

TEXT BOOKS:

- 1. Ellis Horowitz ,Fundamentals of Computer Algorithms, Sartaj Sahni, Rajasekaran, 2nd Edition, University Press, 2008.
- 2 .D. Samanta- "Classic Data Structures"- Prentice-Hall of India- Pvt. Ltd.- India 2006
- 3. Fundamentals of Data structures in C, 2nd Edition, E. Horowitz, S. Sahni and

Susan Anderson-Freed, Universities Press.

REFERENCES :

- 1. Robert Kruse- C.L. Tondo and Bruce Leung- "Data Structures and Program Design in C"- Prentice-Hall of India- Pvt. Ltd.- Third- 2006.
- 2. Jean Paul Tremblay and Paul G. Sorenson- "An Introduction to Data Structures with Applications"-Tata McGraw-Hill- Third Edition- 2006.
- Mark Allen Weiss-" Data Structures and Algorithm Analysis in C"- Pearson Education- Second edition-2006

PRACTICAL COMPONENT:

- 1. Implementation of Recursivefunction
- 2. Array and Linked list implementation of Stack andQueue
- 3. Implementation of Single, Double and circular LinkedList
- 4. Creation and traversal of Binary SearchTree.
- 5. Implement SearchingTechniques
- 6. Implement Insertion Sort (The program should report the number of comparisons)
- 7. Implement Merge Sort(The program should report the number of comparisons)
- 8. Implement Heap Sort (The program should report the number of comparisons)
- 9. Convert Infix expression to Postfix expression using stack.
- 10. Convert Infix expression to Prefix expression using stack
- 11. Binary tree traversals.

212D.CC1202	212BCS1303 PROGRAMMING METHODOLOGIES		Т	Р	Χ	С	
2126051505	PROGRAMMING METHODOLOGIES	4	0	2	3	6	
Course Category	Course Category : Program Core						
Course Type	Integrated Course - Theory						

COURSE OBJECTIVE:

The main objective of the course is to learn the fundamentals of C programming structures with Object Oriented Programming and Methodologies which are essential to building good Object Oriented Applications using C++.

COURSE OUTCOMES :

Upon successful completion of this course, students will be able to

CO1: Understand the basic concepts of C programming

CO2: Describe the reason why different decision making and loop constructs are available for iteration in C

CO3: Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology

CO4: Identify the concepts of inheritance and its types and develop applications using overloading features.

CO5: Discover the usage of pointers with classes, Exception Handling Techniques, Generic Programming with Templates in C++.

MAPPING OF COURSE OUTCOME(S):

				PO			
0/10	1	2	3	4	5	6	7
CO1		S	Μ				L
CO2		S	S		S	L	
CO3	Μ	S	Μ		Μ	S	
CO4			S	L	L	L	
CO5		Μ	Μ	S	L		

UNIT - 1

12 Hours Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables - Defining Symbolic Constants - Declaring a variable as a constant - Operators and Expressions – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

UNIT – II

Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement - if else statement - nesting of if else statements - else if ladder - switch statement - the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

UNIT – III

Introduction to C++ - key concepts of Object-Oriented Programming -Advantages - Object Oriented Languages - I/O in C++ - C++ Declarations-Classes and Objects: Declaring Objects - Defining Member Functions - Static Member variables and functions - array of objects -friend functions - Overloading member functions - Bit fields and classes - Constructor and destructor with static members.

UNIT – IV

Operator Overloading: Overloading unary, binary operators - Overloading Friend functions - type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance - Virtual base Classes - Abstract Classes

UNIT - V

12 Hours

12 Hours

12 Hours

12 Hours

Pointers – Declaration – Pointer to Class, Object – this pointer – Pointers to derived classes and Base classes

- Arrays Characteristics array of classes Memory models new and delete operators dynamic object
- Binding, Polymorphism and Virtual Functions- Templates- Exception Handling Mechanism.

Total : 60 hours

TEXT BOOK:

- **1.** Programming in ANSI C, E.Balagurusamy, 7 th Edition, Tata McGraw Hill Publishing Company, 2017.
- 2. E. Balagurusamy, "Object-Oriented Programming with C++", TMH 2013, 7th Edition.

REFERENCE BOOKS:

1. Ashok N Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education 2003.

2. Maria Litvin& Gray Litvin, "C++ for you", Vikas publication 2002. WEB

REFERENCE BOOKS

- 1. Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015.
- **2.** Programming and problem solving with C++: brief edition, N. Dale and C. Weems, Jones & Bartlett Learning, 2010.

PRACTICAL COMPONENT:

C-Programming

- 1. Write a C Program to find the sum of digits
- 2. Write a C Program to check whether a given number is Armstrong or not
- 3. Write a C Program to check whether a given number is Prime or not
- 4. Write a C Program to generate the Fibonacci series
- 5. Write a C program to find the sum, average, standard deviation for a given set of numbers.
- 6. Write a C Program to display the given number is Adam number or not
- 7. Write a C program to print magic square of order n where n > 3 and n is odd.
- 8. Write a C program to count the number of Vowels in the given sentence.
- 9. Write a C Program to find the grade of a student using else if ladder
- 10. Write a C Program to create an integer file and display the even numbers only

C++- Programming

- 1. Write a C++ Program to create a class to implement the Data Structure STACK.
- 2. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..
- 3. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD(), SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
- 4. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.

- **5.** Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.
- **6.** Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display strings. Overload the Operator + to concatenate two Strings, == to compare two strings
- 7. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.
- 8. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area() and Calculate_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result.
- **9.** Write a C++ Program to create two classes each class consists of two private variables, an integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.
- 10. Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.

211CHY1101	ENVIRONMENTAL STUDIES	L	Т	Р	X	С
		3	0	0	0	3
Course Category: Four	idation Core					
Course Type : Theory						

Course Objectives

Creating awareness among engineering students about the importance of environment, the effect of technology on the environment and ecological balance is the prime aim of the course.

Course Outcome(s)

CO1	To Know the importance of environmental studies and methods of conservation of natural resources.
CO2	Describe the structure and function of an ecosystem and explain the values and Conservation of bio-diversity.
CO3	Explain the sources, environmental effects and control measures of various types of pollutions.
CO4	Select the appropriate methods for waste management.
CO5	Recall social issues and legal provision and describe the necessities for environmental act.

Mapping of Course Outcome(s):

CO/DO			PO		
CO/PO	1	2	3	4	5
CO1	S	L		S	
CO2	L		S		Μ
CO3	Μ	S		Μ	
CO4		Μ	Μ		L
CO5	S	Μ		L	

Unit-I: Natural Resources

Definition, scope, and importance of environmental sciences -Need for public awareness- Natural resources: Forest resources, Water resources, Land resources, Mineral resources, and Energy resources - Role of an individual in conservation of natural resources.

Unit-II: Ecosystem and Biodiversity

Concept of an ecosystem - Structure and function of an ecosystem - Food chains, food webs and ecological pyramids - Biodiversity - Definition, value of biodiversity - Hot spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III: Environmental Pollution

Sources, consequences and control measures of Air pollution, Water pollution, Soil pollution, Thermal pollution and nuclear pollution. Environmental threats -, Acid rain, Climate change, Global warming (Greenhouse effect), Ozone layer depletion. Fireworks: current environmental issues.

Unit-IV: Management of Environmental Pollution

6 Hours

6 Hours

6 Hours

6 Hours

Causes, effects, treatments methods and control measures of solid waste, municipal waste, biomedical waste - Waste minimization techniques - Cleaner technology-- Disaster management: floods, earthquake, cyclone, landslides and Tsunami.

Unit-V: Social Issues and the Environment

6 Hours

Water conservation, rain water harvesting- Environmental impact assessment- Precautionary and polluters pay principle- environment protection act - air (prevention and control of pollution) act - water (prevention and control of pollution) act - Population explosion - Family Welfare Programmes - Environment and human health - Human Rights - Women and Child Welfare.

Text Books

- 1. E.R. Nagarajan and A. Murugan, Environmental Science, Wiley Publishers, New Delhi, 2017, pp. 1-196.
- 2. Dhameja, S. K., Environmental Engineering and Management, S. K. Kataria and sons, New Delhi, 1st edition 2015.
- 3. Anubha Kaushik and Kaushik C.P., Environmental Science & Engineering" New Age international Publishers, New Delhi, 2010.

Reference Books

- 1. Gilbert M. Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., 2nd edition, 2004.
- 2. Erach Bharucha, Textbook for Environmental Studies, UGC, New Delhi, 2004.

211ENG1306	COMMUNICATIVE ENGLISH	L	Т	Р	X	С		
		3	0	2	3	5		
Course Category: Foundation Core								
Course Type : Theory								

Course Description

This course aims to impart better writing skills by sensitizing the learners to the dynamics of effective writing. To build up the learners confidence in oral and interpersonal communication by reinforcing the basics of pronunciation specially focusing on interviews / corporate meetings / international business travels.

Course Outcomes

- 1. To improve and mould students interactive skills in different environments
- 2. To develop and improve students listening capacity
- 3. To enrich and understand students in speaking ability in different situations
- 4. To enhance students reading in through the text
- 5. To gain knowledge about written statements

Unit – I Language in Professional context

Conversation - types - face-to-face conversation - telephone conversation - situational conversation - advantages and disadvantages - etiquettes of conversation.

Unit – II – Listening

Listening - types - techniques of effective listening - barriers of listening - steps to effective listening listening to the audio including lyrics, telephone calls, seminar - understanding the questions asked in seminar-listening to read the text - ask some questions.

Unit – III – Speaking

Speaking - types - importance of speaking skill - fluency - self-introduction - on the spot topic - story telling - narrate any incident -vote of thanks - presenting with Power Point Presentation-to describe any picture group discussion - debate.

Unit – **IV** – **Reading**

What is reading - types - strategies of effective reading - skimming - scanning - reading the text - interpret the text - reading comprehension - story sequencing - cloze reading - reading through visual presentation.

Unit – V – Writing

Writing - types - process of writing skill - letter writing - curriculum vitae - minutes of meeting - welcome address - vote of thanks - mails -giving instructions.

Text Books

- 1. Cambridge English: BEC Preliminary with answers. Cambridge University Press, New Delhi 2016.
- 2. ArunaKoneru, Professional Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

Reference Books

- 1. Dr. A. Vimala, *Career Preparation and Talent Management*, Oviya Publication, Coimbatore
- 2. V. Shasikumar and P V Dhanija, Spoken English. Pub. By: Tata Mcgraw Hill, New Delhi
- 3. Mohan ,Krishna &MeeraBannerji . Developing Communication Skills. Macmillan India Ltd., Chennai. 2001.
- 4. Raman, Meenakshi & Sharma, Sangeetha. *Technical Communication*. Oxford University Press, 2011.

Online References:

- 1. https://en.wikipedia.org/wiki/Listening
- 2. www.cambridgeenglish.org/learning-english
- 3. www.cambridgeenglishonline.com
- 4. www.writeandimprove.com
- 5. https://www.youtube.com/watch?v=qxFtn9pGaTI

212BCS2301	OPERATING SYSTEMS	L	Т	Р	X	C	
Course Cotegoriu Duo		4	0	2	0	5	
Course Category: Program Core							
Course Type : Integrate	ed Course - Theory						

COURSE OBJECTIVES:

This course aims to provide the fundamental concepts and role of Operating System, Process Management and Scheduling Algorithms in Operating Systems, the Memory Management policies, and to give insight on I/O and File management techniques

28

PO

5

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S

PO

6

Μ

S

COURSE OUTCOMES:

CO1: Learn the need of operating system, its components and evolution.

CO2: Understand the concept of process, operations and scheduling.

CO/PO

CO1

CO2

CO3

CO4

CO5

CO3: Acquire the knowledge of process synchronization and deadlock concept.

PO

1

Μ

CO4: To Enrich their knowledge in memory management concept and management techniques.

PO

2

Μ

S

PO

3

PO

4

Μ

М

CO5: Learn Files systems and Windows XP Concepts.

onfiguring, Operating System overview-Hardware Basics-Windows 10: Installing, and deployingWindows10–SystemMaintenance:Hardware-ManagingDisksanddrives-Automating tasks and activities.

S

UNIT - II

UNIT-I

Windows Server 2012-Overview-Working with Windows servers-Preparing networking- Navigating Management options- Managing Servers remotely-Managing roles and features.

UNIT - III

Configuring server settings: Server Naming-Managing Processor Scheduling-allocating virtual memory-Active Directory-understanding-managing -maintaining- AD FS-FSMO Roles-Backup and storage.

UNIT – IV Windows 10 OS

Introduction: Versions, GUI Components, Features, Windows 10: Installation of Client OS, User Management, Disk Management, Security, IP Configuration, File Permissions and Sharing, Backup & **Recovery**, **Devices** and **Printers**

UNIT V Server OS Windows Server 2012

Server OS Windows Server 2012: Installation of Server OS, Installation of Roles and Features, Storage Management, Managing and Monitoring of Server, Backup & Restoration, Basic Server Troubleshooting.

Practical Component:

- 1. Explain the steps to Install the Client OS
- 2. Explain the steps to Create Users and Groups
- Demonstrate the usage of Devices and Printers 3.
- 4. Demonstrate the usage of Disk Management Console
- Explain the steps to Install the Server OS 5.
- Demonstrate how to Install Roles and Features 6.
- 7. Demonstrate the Usage of Server Storage Management

12 hrs

12 hrs

12 hrs

12 hrs

12 hrs

- 8. Explain the various Management and Monitoring requirements
- 9. Explain the Backup Types and steps to take Backups
- 10. Explain Basic Server Troubleshooting Process

TOTAL PERIODS: 60

TEXT BOOK:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, "Operating System Concepts", Wiley India Pvt. Ltd 2018, 10 thEdition

REFERENCE BOOKS:

- 1. William Stallings, "Operating Systems Internals and Design Principles", Pearson, 2018, 9th Edition.
- 2. Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", Pearson 2014, 4thEdition.
- 3. Achyut S Godbole, Operating systems, McGraw-Hill, 3rdedition

212BCS2309 JA	IAVA PROGRAMMING	L	T	Р	X	C			
		4	0	2	3	6			
CourseCategory:ProgramCore									
Course Type: Integrated	Course - Theory								

COURSE OBJECTIVES:

The main objective of the course is to introduce students about object oriented concepts in java programming language and develop java programs to be implemented in various fields.

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to

CO1: To understand the fundamentals of object oriented analysis.

CO2: Understand the constant of variables, data types, operators, branching statements and loopingstatements.

CO3: Ability to implement basic concepts, compile, test and run Java programs comprising more than one class, to address a particular software problem

CO4: Demonstrate an introductory understanding of multithreaded programming, Java API packages, and error and exceptions.

CO5: Understand the concept of File handling and applet programming in java

				PO			
0/10	1	2	3	4	5	6	7
CO1			L	М			
CO2		S	М	М	L		L
CO3			S	S	L		
CO4		L	S	S	L		

MAPPING OF COURSE OUTCOME(S):

12 Hours

	CO5 S
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UNIT-I

FUNDAMENTALS OF OBJECT – **ORIENTED PROGRAMMING:** Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features: **JAVA EVOLUTION:** Java History – Java Features – Java and Internet – World Wide Web – Web Browsers – H/W and S/W requirements – Java Support Systems – Java Environment; **OVERVIEW OF JAVA LANGUAGE:** Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments.

UNIT-II

CONSTANTS, VARIABLES & DATA TYPES: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; **OPERATORS & EXPRESSIONS**. **DECISION MAKING & BRANCHING:** Introduction, Decision making with if statement, Simple if statement, if...Else statement, Nesting of if...else statements, the else if ladder, the switch statement, the conditional operator. **DECISION MAKING & LOOPING**: Introduction, The While statement, the do-while statement, the for statement, Jumps in loops.

UNIT-III

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods; **INHERITANCE:** Extending a class, Overloading methods, Final variables and methods, Final classes, Finalizer methods, Abstract methods and classes; **ARRAYS, STRINGS AND VECTORS:** Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Vectors, Wrapper classes **INTERFACES: MULTIPLE INHERITANCE:** Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT-IV

MULTITHREADED PROGRAMMING: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. **MANAGING ERRORS AND EXCEPTIONS:** Types of errors : Compile-time errors, Runtime errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement.

UNIT-V

12 Hours

12 Hours

12 Hours

PACKAGES: Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package; **APPLET PROGRAMMING;MANAGING INPUT/OUTPUT FILES IN JAVA:** Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

PRACTICAL COMPONENT:

Section: A

Write Programs in Java for the following:

- 1. To implement a simple temperature conversion program.
- 2. To perform addition and subtraction of complex numbers using class and objects.
- 3. To perform volume calculation using method overloading.
- 4. Using command line arguments, test if the given string is palindrome or not.
- 5. String manipulation using String Methods (Use of any five String methods are preferred).
- 6. Write a program to fill names into a list .Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception Invalid Name
- 7. Program to demonstrate the use of any two built-in exceptions in Java.

Section: B

- 8. To perform multiplication of matrices using class and objects.
- 9. Using multilevel inheritance process student marks.
- 10. Implement multiple inheritance for payroll processing.
- 11. Implement interface for area calculation for different shapes.
- 12. Create a package called Arithmetic that contains methods to deal with all arithmetic operators. Also write a program to use the package.

13. Create two threads such that one of the thread generate Fibonacci series and another generate perfect numbers between two given limits.

14. Define an exception called **: Marks Out of bound:** Exception, that is thrown if the entered marks are greater than 100.

- 15. Program to demonstrate the use of Wrapper class methods.
- 16. File Processing using Byte stream.
- 17. File Processing using Character Stream.
- 18. Write applets to draw the following Shapes:

(a). Cone (b). Cylinder (c). Square inside a Circle (d). Circle inside a Square

- 19. Write an applet Program to design a simple calculator.
- 20. Write an Applet Program to animate a ball across the Screen.

Total: 60 Hours

TEXT BOOKS:

Programming with JAVA, A Primer, E.Balagurusamy, 5th Edition, McGraw-Hill Company, 2015

Unit I : Chapters 1 - 3

Unit II : Chapters 4 - 7 Unit III : Chapter 8 - 10 Unit IV : Chapter 12 and 13 Unit V : Chapter 11, 14 and 16

REFERNCES:

- 1. Programming in Java, Sachin Malhotra, Oxford University Press
- 2. Programming with Java, John R. Hubbard, Second Edition, Schaum's outline Series, Tata McGraw-Hill Company.
- 3. Java TM: How to Program, Deitel&Deitel, PHI, 2007
- 4. Java 2- The Complete Reference, Herbert Scheldt , 5th Edition, McGraw Hill Education (India) Private Limited,2002

212BCS2202 WEB PROGRAMMING LAB			Т	Р	Χ	С
212BC52202	WEB PROGRAMMING LAB	0	0	4	0	2
Course Category : ProCourse Type:Pra	ogram core ctical					

COURSE OBJECTIVES

This course will enable the student to gain an understanding of the core concepts and Technologies which constitute Information Technology. Learn how to design and develop a Web page using HTML and CSS through JavaScript to design interactive web sites with all the features given in Web programming.

COURSE OUTCOMES:

Upon successful completion of this course, Students will be able to

CO1: Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

CO2: Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.

CO3: Develop and incorporate dynamic capabilities in Web pages using DOM and JavaScript

MAPPING OF COURSE OUTCOME(S)

				PO			
0/10	1	2	3	4	5	6	7
CO1		Μ			S		Μ
02		L	S		S	S	Μ
CO3	S			Μ			

CYCLE I

- 1. Develop a HTML document, which displays your name as <h1> heading and displays any four of your friends. Each of your friend's names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells about your friend.
- 2. Write names of several countries in a paragraph and store it as an HTML document, world.html. Each country name must be a hot text. When you click India (for example), it must open india.html and it should provide a brief introduction about India.
- 3. Design a HTML document describing you. Assign a suitable background design and background color and a text color.
- 4. Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags
- 5. Insert an image and create a link such that clicking on image takes user to other page.
- 6. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.
- 7. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
- 8. Write an HTML code to display your profile on a web page.

CYCLE II

- 1. Write an html code to display your education details in a tabular format.
- 2. Create a webpage with html describing your department. Use paragraph and list tags.
- 3. Create a table to show your class time-table.
- 4. Create a simple form to submit user input like his name, age, address and favorite subject, movie and singer.
- 5. Add few form elements such as radio buttons, check boxes and password field. Add a submit button at last.

CYCLE III

- 1. Create a web page with a text box and a button. On click of a button a message box is displayed with the text entered by the user in the textbox
- 2. Create a web page with some text in using some color. Change the color of the text on click of a button or on mouse over.
- 3. Client side scripts for validating web form controls Using DHTML
- 4. Embedding javascript in HTML pages.
- 5. Program to create a class calculator that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.
- 6. Event Handling
 - Validation of registration form
 - Open a Window from the current window
 - Change color of background at each click of button or refresh of a page
 - Display calendar for the month and year selected from combo box OnMouseover event

Total: 45 Hours

		L	X	С		
211ENG1304	HUMAN VALUES	2	0	0	3	3
Course Categor Course Type : T	y:Foundation Core Theory		<u> </u>			

Course Objective(s):

1. To Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.

2. To Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.

3. To Become conscious practitioners of human values.

4. To Realise their potential as human beings and conduct themselves properly in the waysof the world.

Course Outcome(s):

After completing this course, the student will be able to:

1. Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.

2. Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.

3. Become conscious practitioners of human values.

4. Realise their potential as human beings and conduct themselves properly in the ways of the world.

MAPPING OF CO TO PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01												
CO2												
CO3												
CO4												
CO5												

H - High Correlation

M-Medium Correlation

L-Low Correlation

Values – Meaning and Definition – Types –Importance – **Love & Compassion :** Introduction – Meaning – Forms of Love – Love for self, Parents, Family, Friends, Spouse, Community, Nation, Humanity and other beings, both Living and Non living – Interrelation between Love & Compassion – Empathy – Sympathy – Non Voilence – Practicing and non Practicing of Love and Compassion.

UNIT II

Truth – Introduction – Meaning –Accuracy – Curiosity – discrement – Fairness – Fearlessness – honesty – honesty – integrity (unity of thought, word and deed) – Intution – Justice – Optimisim – Purity – Quest for knowledge – Reason - Self analysis – Sincerity – sprit of Enquiry – Synthesis – Trust – Truthfulness and determination – Practicing and Non Practicing of Truth.

UNIT III

Non Voilence –Introduction – Meaning – Need of Non Voilence – Prerequisites for Non voilence – Ahimsa (Non voilence and Non-killing) – Values related to Non voilence (Pshychological and Social) – Practicing and Non Practicing of Non Voilence

UNIT IV

Righteouseness – Introduction – Meaning – Righteouseness and dharma – Righteouseness and propriety – Values related to Righteouseness –Values related to Right Conduct or Righteouseness (Self help skills, Social skills and Ethical skills) – Practicing and Non Practicing of Righteouseness

UNIT V

Peace and Services – Introduction – Meaning - Need of Peace – Peace vs harmony and balance – Attention – Calmness – Equality – Equanimity – Faithfulness – Focus – Gratitude – Happiness - humanity – Inner Silence – optimism – Patience – Selfconfidence – Self Control – Self discipline – Self Esteem – Self respect – Self Control – tolerence and Understanding – Practicing and Non Practicing of Peace

Services – Introduction and Meaning – Forms of Services – Service for Self, Parents, Family, Friend, Spouse, Community, Nation, Humanity and other beings—Living and Non-living, Persons in Distress or Disaster – Practicing and Non Practicing of Services.

Renunciation - Introduction – Meaning – Renunciation and sacrifice – Self restrain and ways of overcoming greed – Practicing and Non Practicing of Renunciation

SUGGESTED READINGS:

- 1. Joshi Rokeach (1973). The Nature of Human Values. New York: The Free Press
- 2. R S Nagarazan (2006) A text book of professional ethics and Human values, New age international publishers

211ENG1305		L	Т	X	С	
211ENG1305	PROFESSIONAL SKILLS	1	0	0	3	2
Course Categor Course Type : T	y: Foundation Core heory					

Course Description:

Professional skills are required for an individual to be gainfully employed for a successful and satisfied life. Professional skills are part of life skills. An individual should be able to demonstrate professional skills involving the use of intuitive, logical and critical thinking, communication and

interpersonal skills, not limited to cognitive/creative skills. These skills, behavior and quality of output enhance employability.

Course Objectives:

- CO: 1 To provide opportunity for realizing one's potential through practical experience.
- CO: 2 To increase one's knowledge and awareness of emotional competency and emotional intelligence at place of study/work.
- CO: 3 To develop interpersonal skills and adopt good leadership behavior for empowerment of self and others.
- CO: 4 To set appropriate goals, manage stress and time effectively.
- CO: 5 To manage competency- mix at all levels for achieving excellence with ethics.

Syllabus

Unit – I – Career Skills

Goal Setting - Critical Thinking- Self-esteem - Social skills- Interpersonal Skills -- Public Speaking

Unit – II Team skills

Communication- Active Listening - Preparing resume/CV - Interview -

Unit – III Presentation Skills

Creative Thinking - Social Cultural Etiquettes - Presentation Skills - Body Language

Unit – IV Leadership Skills

Problem Solving – Strategic Thinking Skills – Creativity

Unit – V Management Skills

Decision Making -Stress Management - Tips to relieve from stress - Yoga - Meditation

Textbooks:

- Kevin Retz. *The Professional Skills Handbook for Engineers and Technical Professionals*, CRC Press, Taylor and Francis Group, London, 2019.
- 2. Stephanie Lynn Slocum. SHE Engineers. Engineers Rising LLC; 1st edition, 2018. USA.
- 3. Sangeetha Sharma and Binod Mishra. *Communication Skills for Engineers and Scientists*. PHI Learning, New Delhi. 2010.
- 4. Wolfgang Linden. *Stress Management: From Basic Science to Best Practice*. Sage Publications, New Delhi. 2005.
| 212BCS2304 DATABASE MANAGEMENT SYSTEM | | | T | P | X | С |
|---------------------------------------|--|--|----------|----------|----------|---|
| | | | 0 | 2 | 0 | 5 |
| Course Categor
Course Type : In | y: Program Core
ntegrated Course - Theory | | | | | |

COURSE OBJECTIVES

This course is designed to educate students with fundamental concepts of Data Base Management System, Data Models, and Different Data Base Languages.

COURSE OUTCOME(S)

CO1: Analyze the basic concepts of database design.

CO2: Acquire knowledge in relational models.

CO3: Ability to create efficient SQL queries for retrieving the data

CO4: Ability to create intermediate SQL queries.

CO5: Building programs using Advanced SQL.

MAPPING OF COURSE OUTCOME(S):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S		М			S
CO2		S			S	
CO3		S	Μ			
CO4	S			М		S
CO5			S		М	

UNIT - I: INTRODUCTION

Database-System Applications-Purpose of Database Systems-View of Data-Database Languages - Database Design-Database Engine -Database and Application Architecture - Database Users and Administrators

UNIT - II: Introduction to the Relational Model

Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages - The Relational Algebra

UNIT – III: Introduction to SQL

Overview of the SQL Query Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries - Modification of the Database

12 Hours

12 Hours

12 Hours

UNIT – IV: Intermediate SQL

Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas - Index - Definition in SQL - Authorization

UNIT – V: Advanced SQL 12 Hours

Accessing SQL from a Programming Language - PL/SQL - Functions and Procedures – Triggers - Recursive Queries - Advanced Aggregation Features – cursors - exceptions **PRACTICAL COMPONENT:**

- 1. Using Different operators
- 2. using Control Structures
- 3. implement Built-in functions
- 4. implement update and Alter table
- 5. implementing PL/SQL Block
- 6. implement PL/SQL table and record
- 7. using Functions
- 8. using Cursors
- 9. using Triggers

Total Hours: 60

Text Book:

- [1] Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 7E, McGraw Hill education, 2019.
- [2] Nilesh Shah, "Database Systems Using ORACLE", PHI, 2nd Edition, 2011

Reference Books:

- [1] Fundamentals of Database Systems, 6/e, RamezElamassri and Shankant B-Navathe, Pearson Education Delhi, 2010.
- [2] Database System Concepts, Peter Rob, Carlos Coronel, Cengage Learning, 2008.
- [3] Database Development and Management, Lee Chao, Auerbach Publications, 2010.

212BCS2306	COMPLITER NETWORKS	L	Т	Р	X	С			
212DC52500		4	0	2	0	5			
Course Category: Program Core									
Course Type: Integrated C	ourse - Theory								

COURSE OBJECTIVES:

The main objective of the course is to understand the fundamental concepts of computer networking with the basic taxonomy and terminology of the computer networking area. This course enables the students

12 Hours

to introduce the student to advanced networking concepts and to allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

COURSE OUTCOMES

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

CO1: Build an understanding of the fundamental concepts of computer networking.

CO2: Provide a overview of the different design issues and functionality of each network layer

CO3: Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model

CO4: Understand IP Addressing - including the interaction of protocols across layers

CO5: Analyze the limitations and behaviors of various routing algorithms and protocols

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

MAPPING OF COURSE OUTCOME(S):

Unit I - Introduction to Network Basics

Introducing Computer Networks –Purpose of Networks - Operation Flow of Computer Networks – Topologies of Computer Networks – The OSI Reference Model: Introduction to the OSI Reference Model – Seven Layers – Benefits of the OSI Reference Model – Introduction the TCP/IP Protocol Suite

Unit II – Internet IP Addressing & Subnet Masking

Local Area Network, Ethernet Networking, Ethernet Standards - Ethernet in OSI model - IP Addressing: The Purpose of IP addresses – The Hierarchy of IP Addresses – Subnetting: Subnetting Basics – IP Address Class and Subnet Mask – Variable Length Subnet -Switches: Purpose of switches – Switch functions – Connecting to Cisco Switch – Configuring Cisco Switch – Managing Cisco Switch Authentication.

Unit III – Spanning Tree Protocols & VLAN

Spanning Tree Protocol – Introducing the Spanning Tree Protocol – STP Operation Flow -Introducing Cisco Options for STP-Introducing Rapid Spanning Tree Protocol- Ethernet Channel – Monitoring STP- Virtual LocalArea Networks – Introducing Virtual Local Area Networks-

12

12

12 HOURS

Benefits of VLANs – Managing VLANs – VLAN Trunking – VLAN Trunking Protocol & VTP 2

Unit IV - Routing Protocols

Network Routing – Introducing Network Routes – Routing Protocols – Routed Protocols – Routing Decision Protocols – Routing Decision Criteria- Routing Methods – Routing Information Protocol- Introducing Routing Information Protocol - Enhanced Interior Gateway Routing Protocol- IGRP – The Foundation of EIGRP – EIGRP Benefits – Characteristics of EIGRP – EIGRP Operation – Open Shortest Path First Protocol – Introducing Open Shortest Path First – OSPF Routing Hierarchy

Unit V Network Security

Network Security Basics: Network Zoning – Recognizing Security Risks – Introducing Security Risk Mitigation Methods – IP Access Lists – Purpose of Access Lists – Types of ACLs-Managing ACLs- Creating ACLs – Network Address Translation (NAT) – Purpose of NAT – Operational Flow of NAT

PRACTICAL COMPONENT:

- 1. Modes in Switches
- 2. Switch Authentication
- 3. Switching in Half-duplex mode
- 4. Connecting PCs and assigning IP Address
- 5. Telnet
- 6. Port Security
- 7. Virtual LAN (VLAN)
- 8. VLAN Trunking Protocol (VTP)
- 9. Spanning Tree Protocol (STP)
- 10. Static /Dynamic Routing Protocols

Total: 60 Hours

Text Book

1. SilviuAngelescu "CCNA Certification All- in-One For Dummies For Dummies" 2010

Reference Books

1. Behrouz A Forouzan "Data Communications and Networking" Tata McGraw Hill 5th Edition, 2017

- 2.Kurose James F. Ross Keith W. "Computer Networking A Top-Down Approach" Pearson Education 6th Edition, 2017
- 3.William Stallings "Data and Computer Communications" Pearson Education 10th Edition, 2017

12 HOURS

12 HOURS

212BCS2101	01 PROCESS MANAGAMENT	L	Т	Р	X	С				
		3	0	0	0	3				
Course Category : Program Core										
Course Type: Th	neory									

COURSE OBJECTIVES:

The main objective of the course is to define and highlight importance of software project management and to familiarize the learner with different techniques for software cost estimation and activity planning.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

CO1:describe and determine the purpose and importance of project management

CO2: compare and differentiate organization structures and project structures

CO3: implement a project to manage project schedule

CO4:understand various controlling factors of a project

CO5: understand the human resource related concepts of a project

MAPPING OF COURSE OUTCOME(S):

CO / PO	РО									
00110	1	2	3	4	5	6	7			
CO1		L			S		S			
CO2				М	S		М			
CO3	L	L		М	S		Μ			
CO4				М	S		Μ			
CO5				М	S		М			

UNIT I PROJECT EVALUATION AND PROJECT PLANNING 9 hrs

Importance of Software Project Management – Activities - Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Projectportfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic programManagement – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION 9 hrs

Software process and Process Models – Choice of Process models - Rapid Application development– Agile methods – Dynamic System Development Method – Extreme Programming– Managinginteractive processes – Basics of Software estimation – Effort and Cost estimation techniques –COSMIC Full function points - COCOMO II - a Parametric Productivity Model.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT 9 hrs

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling –Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning – RiskManagement – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.

UNIT IV PROJECT MANAGEMENT AND CONTROL 9 hrs

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring– Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – SoftwareConfiguration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS

Managing people – Organizational behavior – Best methods of staff selection – Motivation – TheOldham – Hackman job characteristic model – Stress – Health and Safety – Ethical and Professionalconcerns – Working in teams – Decision making – Organizational structures – Dispersed and Virtualteams – Communications genres – Communication plans – Leadership.

TEXTBOOK:

 Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

1. Robert K. Wysocki "Effective Software Project Management" - Wiley Publication, 2011.

TOTAL: 45 hrs

9 hrs

212BCS2115	VIRTUALIZATION TECHNIQUES	L	Т	Р	X	С
		4	0	2	0	5
Course Category: Prog	ram Core					
Course Type : Integ	rated Course - Theory					

COURSE OBJECTIVES:

This course gives students an insight into the basics of virtualization, Types of virtualizations, solutions for various virtual machines. It will provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.

COURSE OUTCOMES:

CO1: To understand what is Cloud Computing.

CO2: Know the architecture of the cloud and the usage of clouds.

CO3: Secure their data from the security issues.

CO4 Understand what is Virtualization

CO5: Understand Cloud Types and Cloud Service Deployment Models (IaaS*, PaaS*, SaaS*).

MAPPING OF COURSE OUTCOME(S):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S						
CO2		М					S
CO3			S				
CO4				М	S		М
CO5		S				S	

UNIT I - DISTRIBUTED SYSTEMS

Distribute a system - Distributed algorithm - Distributed Data Stores - Distributed Computing - File Systems - Distributed Messaging - Distributed Applications – Distributed Transaction - Parallel and distributed computing - Applications.

UNIT II - CLOUD CONCEPTS

Introduction Cloud Computing - Advantages of Cloud - Public Cloud - five essential characteristics - three service models - Four deployment models - Benefits of Cloud Computing - Cloud Vendors - Traditional Infrastructure setup and Challenges – AWS.

UNIT III - VIRTUALIZATION

12

12

Introduction to vSphere and the Software - Defined Data Center Creating Virtual Machines - VCenter Server - Configuring and Managing - Virtual Networks Configuring and Managing Virtual Storage - Virtual Machine Management - Resource Management and Monitoring.

UNIT IV - VIRTUAL MACHINES

vSphere HA - vSphere Fault Tolerance - Protecting Data vSphere DRS - Network Scalability - vSphere Update Manager and Host Maintenance - Storage Scalability - Securing Virtual Machines.

UNIT V- DATACENTER

Data center overview -Components - Provisions - Need of Data Center - Data Center Architecture - Different Racks - Data center architecture for cloud computing - role of data center in cloud computing.

TOTAL: 60 HRS

REFERENCE BOOKS:

[1] Jean Dollimore formerly of Queen Mary, Tim Kindberg, "Distributed Systems Concepts and Design", 5th Edition Cambridge University, University of London

[2]. VenkataJosyula, Malcolm Orr, Greg Page, "Cloud Computing: Automating the Virtualized Data Center", 1st Edition.

[3] . Brian J.S. Chee, Curtis Franklin Jr., "Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center", 1st Edition

WEBSITES

1.https://www.ibm.com/support/knowledgecenter/en/SSAL2T_8.2.0/com.ibm.cics.tx.doc/concepts/c_wht_i s_distd_comptg.html

2. https://www.w3schools.in/cloud-computing/cloud-virtualization/

3. http://www.vmwarearena.com/what-is-vmware-vsphere-beginners-guide-to-vmware-virtualization/

4. https://aws.amazon.com/getting-started/tutorials/

COURSE OBJECTIVES:

- To make the students understand the essential and fundamental aspects of object oriented concepts along with their applications.
- To discuss and explore different analysis models, design and implement models of object-oriented software systems by means of a mid-sized project.
- To teach the students a solid foundation on different software development life cycle of Object-

С L 212BCS2116 **OBJECT ORIENTED SYSTEM DEVELOPMENT** 0 4 0 0 4 Course Category : Program Core **Course Type:** Theory

12

12

Т Ρ X Oriented solutions for Real-World Problem

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

CO1: Identify and select suitable Process Model for the given problem and have a thorough understanding of various Software Life Cycle models.

CO2: Analyze the requirements of the given software project and produce requirement specifications.

CO3: Apply the knowledge of object-oriented modelling concepts and design methods with a clear emphasis on Unified Modelling Language for a moderately realistic object oriented system.

CO4: Apply various software architectures, including frameworks and design patterns, when developing software projects and evaluate the software project using various Testing techniques.

CO5: Predict the deployment strategy of the software project and recognize the Configuration Management strategies of the software project

CO/PO	РО	РО									
00/10	1	2	3	4	5	6	7				
CO1		L			S		S				
CO2				Μ	S		М				
CO3	L	L		М	S		М				
CO4				Μ	S		М				
CO5				Μ	S		М				

MAPPING OF COURSE OUTCOME(S):

UNIT I - INTRODUCTION TO SOFTWARE DEVELOPMENT & PROCESS MODELS 12

The Challenges of Software Development – An Engineering Perspective – Object-Orientation - Iterative Development Processes. PROCESS MODELS -Life cycle models – Unified Process – Iterative and Incremental – Workflow – Agile Processes.

UNIT II - MODELING - OO SYSTEMS & ANALYSIS

Requirements Elicitation – Use Cases – Unified Modeling Language, Tools. Analysis Object Model (Domain Model) – Analysis Dynamic Models – Non-functional requirements – Analysis Patterns.

12

12

UNIT III – DESIGN

System Design, Architecture – Design Principles - Design Patterns – Dynamic Object Modeling – Static Object Modeling – Interface Specification – Object Constraint Language.

UNIT IV - DESIGN PATTERNS

Introduction – Design Patterns in Smalltalk MVC – Describing Design patterns –Catalog of Design Patterns-Organizing the Catalog –How Design Patterns Solve Design Problems – How to select a Design Pattern – How to use a Design Pattern – What makes a pattern? – Pattern Categories – Relationship between Patterns – Patterns and Software Architecture

UNIT V - IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE & RECENT TRENDS12

Mapping Design (Models) to Code – Testing - Usability – Deployment – Configuration Management – Maintenance. Recent Trends in Object oriented Software Development

TOTAL: 60 HRS

TEXTBOOK:

Carol Britton and Jill Doake, A Student Guide to Object-Oriented Development (Oxford: Elsevier, 2005)..

REFERENCES:

- 2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable object-oriented software", Addison-Wesley,1995.
- 3. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2004
- 4. Ivar Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process, Pearson Education, 1999.
- 5. Alistair Cockburn, Agile Software Development 2nd ed, Pearson Education, 2007.

List of Experiments

- 1. Introduction and project definition
- 2. Software requirements Specification
- 3. Introduction to UML and use case diagrams
- 4. System modelling (DFD and ER)
- 5. OO analysis: discovering classes
- 6. Software Design: software architecture and object oriented design
- 7. Flow of events and activity diagram

- 8. State Transition Diagram
- 9. Component and deployment diagrams
- 10. Software testing (RFT,SCM Tools)

212BCS2117	INTRODUCTION TO DIGITAL	L	Т	Р	X	C					
	TECHNOLOGIES	4	0	0	0	4					
Course Category : Prog	Course Category : Program Core										
Course Type : Theo	ory										

COURSE OBJECTIVES:

- > To understand the fundamental concepts of digital technology
- > To introduce the concept s of cloud, big data, digital marketing
- > To introduce the principles of Artificial Intelligence, Block chain technology
- > To recognize the use of Digital technology in various Industries
- > To understand the principles of Automatix, Automation Anywhere
- To understand and create Bots

COURSE OUTCOMES:

CO1: Understand the fundamental concepts of digital technology

CO2: Comprehend the concept s of cloud, big data, digital marketing

CO3: Familiarize the principles of Artificial Intelligence, Block chain technology

CO4: Recognize the use of Digital technology in various Industries

CO5: Understand the principles of Automatix, Automation Anywhere 6. Create bots and understand its various types

CO/P	PO	PO	PO	PO	PO	PO
0	1	2	3	4	5	6
CO1	S					W
CO2				М		
CO3		S	М			
CO4					W	
CO5			М			S

UNIT: I DIGITAL PRIMER

Digital Primer - Why is Digital Different? Digital Metaphors - On Cloud 9 - A Small Intro to Big Data - Social Media & Digital Marketing- Artificial Intelligence - Unchain the Blockchain - Internet of Everything Immersive Technology

UNIT: II DIGITAL FOR INDUSTRIES Manufacturing and HiTech - Banking and Financial Services - Insurance and Healthcare - Retail - Travel & Hospitality - Communications, Media & Information Services - Government

UNIT: III AUTOMATIX

Automatix - Art of RPA - Introduction - Setting the Context - RPA Prelude - RPA Demystified - RPA vs BPM - RPA Implementations - RPA in Industries - RPA Tools -Automatix - Art of RPA-Course Conclusion

UNIT: IV AUTOMATION ANYWHERE

Automation Anywhere - Getting Started with AA Enterprise - Exploring AA Enterprise -AA Enterprise – Architecture - Knowing the Bots.

UNIT: V KNOWING BOTS

More About TaskBots - AA Enterprise - Assess your Learning - All About Recorders - Designers - MetaBots - Cognitive RPA - AA Enterprise - Closure Note

TOTAL: 60 Hrs

REFERENCE BOOKS

1. Richard Murdoch, "Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become an RPA Consultant"

2.Kelly Wibbenmeyer, "The Simple Implementation Guide to Robotic Process Automation (RPA): to Best Implement RPA in an Organization" How

212BCS2118	HUMAN COMPUTER INTERACTION	L	Т	Р	X	С				
		4	0	0	0	4				
Course Category: Program Core Course Type: Theory										

COURSE OBJECTIVES:

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.
- To learn the guidelines for user interface.

COURSE OUTCOMES:

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

CO1: Design effective dialog for HCI

CO2: Design effective HCI for individuals and persons with disabilities.

12

12

12

49

CO3: Assess the importance of user feedback.

CO4: Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites. CO5: Develop meaningful user interface.

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

MAPPING WITH PROGRAMME OUTCOMES

UNIT I FOUNDATIONS OF HCI

The Human: I/O channels – Memory – Reasoning and problem solving; The Computer: Devices – Memory - processing and networks; Interaction: Models - frameworks - Ergonomics - styles - elements interactivity- Paradigms. - Case Studies

UNIT II DESIGN & SOFTWARE PROCESS

Interactive Design: Basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process: Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques - Universal Design

UNIT III MODELS AND THEORIES

HCI Models: Cognitive models: Socio-Organizational issues and stakeholder requirements -Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools. – Case Studies

UNIT V WEB INTERFACE DESIGN

Designing Web Interfaces - Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow – Case Studies

TEXT BOOKS:

- 1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, —Human Computer Interaction, 3rd Edition, Pearson Education, 2004 (UNIT I, II & III)
- 2. Brian Fling, --Mobile Design and Development, First Edition, O'Reilly Media Inc., 2009 (UNIT --IV)
- 3. Bill Scott and Theresa Neil, —Designing Web Interfaces, First Edition, O'Reilly, 2009. (UNIT-V)

12 HOURS

12 HOURS

12 HOURS

TOTAL : 60 PERIODS

12 HOURS

12 HOURS

212BCS2311	CAMPUS TO CORPORATE	L	Т	Р	X	С
2120032511		1	1	2	0	2
Course Category: P	rogram Core					

Course Type : Practical

Overview of Corporate Ice breaker - What is Corporate? - History of Corporate - Overview of BPS Industry - What is BPS? - History of BPS - Benefits of BPS - BPS Industry in World - BPS Industry in India - TCS BPS

UNIT II

Difference between Campus and Corporate - Change Management(Understand the difference between campus and corporate life and prepare themselves for the same.

UNIT III

Corporate Etiquettes - Dressing & Grooming Skills - Workplace etiquette - Business etiquette - E-Mail etiquette - Telephone etiquette - Meeting etiquette - Presentation Skills. Professional Competencies -Analytical Thinking - Listening Skills - Time management-Team Skills – Assertiveness - Stress Management - Interview facing – Ownership - Attention to Detail

UNIT IV

Grammar – Parts of speech, Tenses, Punctuation, Prepositions, Sentence construction– Phonetics - Identification of Sounds, Consonants and vowels, International Phonetics Alphabets, Phonetic Practice, Vocabulary, Pronounciation- One on one basic conversation skill practice-skit to showcase the basic conversation skill

UNIT V

Reading Comprehension - Listening Comprehension - Improving Vocabulary - Improving Writing Skills -Comprehension while interacting face to face - Recitation of short stories - Interview Skills - Group Discussion - Social Conversation Skills – Presentation - One Act Plays

212BCS2213MULTIMEDIA LABLTPXC00402

15

10

10

10

15

TOTAL: 30 Hrs

Pre-requisite: Basic knowledge about multimedia

Course Category: Program Core Course Type: Practical

COURSEOBJECTIVE(S):

This course is designed to design, create, build, and debug attractive multimedia applications.

COURSEOUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the components of multimedia.

CO2: Analyze the different hardware devices used in multimedia project development.

CO3: Work with different font styles and design tools.

CO4: Develop projects using drawing techniques.

CO5: Implement effective real time multimedia application by including audio and video.

MAPPING OF COURSE OUTCOME(S)

CO/P	PO	PO	PO	PO	PO	PO
0	1	2	3	4	5	6
CO1	S				W	
CO2		S				
CO3		S				
CO4					S	S
CO5				S		S

LIST OF EXPERIMENTS:

- 1. Procedure to create an animation to represent the growing moon.
- 2. Procedure to create an animation to indicate a ball bouncing on steps.
- 3. Procedure to simulate movement of a cloud.
- 4. Procedure to draw the fan blades and to give proper animation
- 5. Procedure to display the background given(filename: tulip.jpg) through yourname.
- 6. Procedure to create an animation with the following
 - features. Welcome
 - Letters should appear one by one
 - The fill colour of the text should change to a different colour after the display of the fullword
- 7. Procedure to simulate a ball hitting anotherball.
- 8. Procedure to create an animated cursor using start drag("ss", true);mouse. Hide();
- 9. Procedure to design a visiting card containing atleast one graphic and textinformation.
- 10. Procedure to take a photographic image. Give a title for the image. Put the border. Write your names. Write the name of institution and place.
- 11. Procedure to prepare a cover page for the book in your subject area. Plan your

owndesign.

- 12. Procedure to extract the flower only from given photographic image and organizeit on a background. Selecting your own background fororganization.
- 13. Procedure to adjust the brightness and contrast of the picture so that it gives an elegantlook.
- 14. Procedure to position the picture preferably on a plain background of a colour of your choice -positioning includes rotation and scaling.
- 15. Procedure to remove the arrows and text from the given photographic image
- 16. Procedure to type awordand apply the effects shadow emboss
- 17. Procedure to use appropriate tool(s) from the toolbox, cut the objects from 3 files (f1.jpg, f2.jpg& f3.jpg); organize them in a single file and apply feather effects.
- 18. Procedure to displaythe background given(filename: garden.jpg) through your name usingmask.
- 19. Procedureto make anyone of one of the parrots black & white in a given picture
- 20. Procedure to change a circle into a square using flash.

Total Hours: 30

DISCIPLINE SPECIFIC ELECTIVES

GROUP I

PRACTICAL APPROACH TO DATA MINING & ANALYTICS

L	Т	Р	Х	С
4	0	2	0	5

Course Category: Discipline Specific Elective **Course Type** : Integrated Course - Theory

PREREQUISITE

Basic knowledge of data and linear algebra

COURSE OBJECTIVES

This course aims to make the students understand the advanced concepts of

COURSE OUTCOME(S)

CO1: Fundamentals of Data mining and data analytics

CO2: Understand various techniques involved in data preprocessing

CO3: Development of suitable machine learning algorithms for various data mining tasks

CO4: Understand various concepts in analytics

CO5: Apply the concepts in real life applications

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1							
CO2							
CO3							
CO4							
CO5							

UNIT – I: Introduction to Data Mining

Basic concepts of Data Mining, Data Mining techniques, Related technologies

UNIT – II: Data Preprocessing

Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies

UNIT – III: Data Mining Algorithms & Data Analytics Using Programming Tools

Association rules, Classification, Prediction, Clustering

UNIT – IV: Topics in Analytics

Association and correlation analysis - regression models, Predictive analytics, Exploratory analysis

UNIT – V: Case Studies

Image analytics, Text analytics

Total Hours: 60

Text Book TCS ion

ARTIFICIAL INTELLIGENCE FOR REAL WORLD APPLICATION

L	Т	Р	X	С
4	0	2	0	5

Course Category: Discipline Specific Elective **Course Type** : Integrated Course - Theory

PREREQUISITE

Basic knowledge of Mathematics and Statistics, Linear Algebra

COURSE OBJECTIVES

This course aims to make the students understand the advanced concepts

COURSE OUTCOME(S)

- CO1: Fundamentals of Artificial Intelligence
- CO2: Demonstrate the concepts of searching and reasoning
- **CO3:** Demonstrate the concepts of machine learning
- CO4: Design of Time series algorithms
- **CO5:** Ability to create programs on machine learning algorithms.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	
CO1							
CO2							
CO3							
CO4							
CO5							

UNIT – I:

Introduction to Artificial Intelligence (AI)

History of AI, Tools to be used for AI programming and its overview, What is cognitive science and the problem of perception, Applications of AI

UNIT – II:

Search & Reasoning

Intelligent agents, uninformed search, Search Techniques 1 - search space, state space search, Search Techniques 2 - heuristic search, and pattern-directed search, Planning, control strategies and implementation, constraint satisfaction, Problem solving by heuristic search, A* algorithm, AO* algorithm, Adversarial search, game playing Proposition and first-order logic, Rule-based systems, semantic net, conceptual graph, inference and deduction, Resolution refutation, answer extraction, Reasoning under uncertainty - probabilistic reasoning, belief networks

UNIT – III:

Machine Learning

Basic concepts, Linear models, perceptrons, Introduction to supervised learning and k-nearest neighbors (KNN), decision trees, Advanced models - support vector machine (SVM), ensemble classifiers, Introduction to unsupervised learning and clustering methods **Deep Learning**

Introduction to neural networks, Backpropagation, Training neural nets using keras, Regularization, batch normalization, dropout, Introduction to convolutional neural networks (CNN), Introduction to natural language processing (NLP) and toolkits

UNIT – IV: Time Series Analysis

Introduction to time series, Stationary time series, Smoothing time series, Autocorrelation functions, Autoregressive integrated moving average (ARIMA) models, Signal transformations, Deep learning and time series analysis

UNIT – V: Tensor Flow

Introduction to TensorFlow, Convolutional neural networks with TensorFlow, Using TensorFlow for implementing regression and clustering methods

Total: 60 Hours

Text Book

TCS ion

213BCS3121 INFORMATION SECURITY – PRACTIONER'S PERSPECTIVE	L	Т	Р	X	С
	PERSPECTIVE	4	0	2	0
Course Categor Course Type :					

PREREQUISITE

Basic concepts of Information Systems, Computer Networks and Software Development is required for taking up this course.

COURSE OBJECTIVES

- To introduce the information technology and security techniques.
- To study the security functional requirements.
- To learn the security assurance requirements.
- To be familiar with protecting of the profile and the target security issues.
- To evaluate and analyze the security techniques.

COURSE OUTCOME(S)

CO1: Understand the basics of information technology and security techniques.

CO2: Identify the security functional requirements.

CO3: Apply the security assurance requirements.

CO4: Analyze and validate the protection profile and target the criteria of security.

CO5: Apply the Security evaluation techniques.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1							
CO2							
CO3							
CO4							

CO5							
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UNIT – I: INTRODUCTION TO BASIC SECURITY SERVICES

Computer security concepts, Confidentiality and integrity, Security architecture for open systems, Computer security trends, Network mapping using ICMP (internet control message protocol) queries, TCP (transmission control protocol) pings, TCP (transmission control protocol) and UDP (user datagram protocol) port scanning, FTP (file transfer protocol) bounce scanning, Vulnerability scanning, System and network penetration, denial-of-service - defence and response

UNIT – II: PROTOCOLS ATTACKS AND DEFENCE MECHANISMS

Network layer, Transport layer, Application layer

UNIT – III: MALICIOUS SOFTWARE

Types of malicious software (malware), Propagation - infected content, viruses, vulnerability exploit, worms and propagation social engineering - spam email, Trojans, Payload system corruption, attack agent - zombie, bots, information theft - keyloggers, phishing, spyware, stealth - backdoors, rootkits

UNIT - IV: CRYPTOGRAPHIC TOOLS

UNIT - V: TOPICS IN SECURITY

Security auditing - security auditing architecture, security audit trail, implementing, Legal and ethical aspects - cyber crime and computer crime, intellectual property, privacy, ethical issues

Total: 60 Hours

Text Book: TCS ION

GROUP II

213BCS3122	DATA MODELING	L	Т	Р	X	С
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	AND VISUALIZATION	4	0	2	0	5			
Course Category: Discip	Course Category: Discipline Specific Elective								

PREREQUISITE

Basic knowledge of programming fundamentals

COURSE OBJECTIVES

This course aims to make the students understand the advance concepts of data modeling and visualization

COURSE OUTCOME(S)

CO1: Fundamentals of data modeling

CO2: Demonstrate the concepts of R Programming

CO3: Demonstrate the concepts of Data clustering

CO4: Design of Data Analytics using visualization

CO5:.Ability to create programs on Analytics.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S					Μ
CO2		Μ	S			Μ
CO3	Μ	S			S	
CO4			L			
CO5		S		L		S

UNIT – I: Data-Analytic Thinking

Knowing your data, Data preprocessing, Storytelling with data

UNIT – II: Data Visualization using R

Introduction to R programming, Visualization using R, Transformation using R, Exploratory data analysis

UNIT – III: Data Modeling

Linear regression, Logistic regression, K-nearest neighbors, K-means clustering, Performance measure, Implementation of some modeling algorithms using R

UNIT - IV: Data Visualization using Tableau

Introduction to Tableau, data import and management, data type and operations, Different types of data visualizations, dashboards, storytelling, Understanding the concepts of dynamic/interactive data visualization and report generation

UNIT – V: Data Modeling from Different Data Sources for Visualization

Understanding structured, unstructured and semi-structured data sources, Data modeling and creating visualization charts/dashboards from structured data like databases (SQL and NoSQL), Data modeling and

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creating visualization charts/dashboards from semi-structured data like CSV files, XML, JSON and others, Data modeling and creating visualization charts/dashboards from live streaming data

Total Hours: 60

Textbook

TCS ion

213BCS3123 MACHINE LEARNING FOR REAL-WO APPLICATION	MACHINE LEARNING FOR REAL-WORLD	L	Т	Р	X	С		
	APPLICATION	4	0	2	0	5		
Course Catego Course Type :	Course Category: Discipline Specific Elective Course Type : : Integrated Course - Theory							

PREREQUISITE

Basic knowledge of Mathematics and Statistics, Linear Algebra.

COURSE OBJECTIVES

This course aims to make the students understand the advance concepts of Machine learning

COURSE OUTCOME(S)

CO1: Fundamentals of statistics

CO2: Demonstrate the concepts of supervised learning

CO3: Demonstrate the concepts of Data preparation

CO4: Design of Data sample

CO5: Ability to create programs on machine learning algorithms.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S					Μ
CO2		Μ	S			Μ
CO3	Μ	S			S	
CO4			L			
CO5		S		L		S

UNIT – I:

Basics of Statistics - Linear algebra - Mathematical statistics

UNIT – II:

Basics of Machine Learning – Introduction - Supervised learning

UNIT – III:

Machine Learning Methodology - (CRISP DM) - Data understanding - Data preparation

UNIT – IV:

Key Concepts in Machine Learning - Data sample , Model selection

UNIT - V:

Machine Learning Algorithms with Real-Life Use Cases - Unsupervised algorithms- Classification algorithms

Total Hours: 60

Text Books

TCS ion

213BCS3124	PRACTICAL APPROACH TO CYBER	L	Т	Р	Χ	С		
	SECURITY	4	0	2	0	5		
Pre-requisite: Basic knowledge on computer networks and security								
CourseCategory: Dia	sciplineSpecific							
Elective	Elective							
Course Type: Integra	ted Course - Theory							

COURSE OBJECTIVES:

Introduce the concepts of the cyber security cryptography and various network security techniques

Unit I

Need for Cyber Security and Security Mindset ,Threat Modeling and Security Architecture Basics of Cryptography

Historical overview, asymmetric/symmetric ciphers, hash functions, Digital signature, certificate, transport layer security (TLS)

Unit II

Web Security: Web Attacks and Defences

How internet and web works: underlying techniques recap, SQL injection attacks and mitigation, Cross-site scripting (XSS) attacks and defences, Cross-site request forgery (CSRF) attacks and defences, Web tracking and web privacy

Unit III

Network Security

Network threat model, Tools of the trade: ping, nmap, traceroute, wireshark, tcpdump, Protocol attacks: blind spoofing, SYN flooding, DDoS attacks and defences, Botnets and crimeware, VPN and firewalls

Unit IV

Authentication and Access Control & Database Encryption

Access control models, Passwords: attacks and defences, OAuth 2.0, Multi-factor authentication, Biometrics Encrypted file systems, Application-level encryption

Unit V

Authentication and Access Control & Database Encryption

Access control models, Passwords: attacks and defences, OAuth 2.0, Multi-factor authentication, Biometrics Encrypted file systems, Application-level encryption

Total Hours: 60

Text Book: TCS ion

GROUP III

212DCS2125	APPLICATION OF DEEP LEARNING AND NEURAL	L	Τ	P	X	С	
2156085125	NETWORKS	4	0	2	0	5	
Pre-requisite: Basic algebra							
Course Catego	Course Category: Discipline Specific Elective						
Course Type:	: Integrated Course - Theory						

COURSE OBJECTIVES:

Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.

Unit I

Preliminaries: Introduction - Machine learning

Unit II

Basics of Neural Networks: Artificial neural networks - Popular networks - Popular tools - Case studies -The human brain

Unit III

Deep Neural Networks: Introduction to Deep Learning (DL) - Convolutional Neural Networks (CNN) -Modern CNN architectures - Image classification using CNN.

Unit IV

Deep Neural Networks: Recurrent Neural Networks (RNN) & LSTM - Word vector representations -Sentiment analysis - Sentence classification - Application in Natural Language Processing (NLP)

Unit V

Emerging Trends: Attention mechanisms and memory networks -. Embeddings from LASER

Total: 60 Hours

Text Book:

TCS ion

213BCS3126 DATA ANALYTICS & REPORTING		L	T	Р	X	C				
		4	0	2	0	5				
Pre-requisite:Basic Knowledge about data analytics										
Course Category: Discipline Specific Elective										
Course Type: Integrated Course - Theory										

COURSE OBJECTIVES:

This course aims to familiarize the students with the basic concepts of data analytics and data reporting and equipping the learners with using tools and techniques for data reporting.

Unit 1: Introduction to Data Science and Analytics

12 Hours

12 Hours

12 Hours

12 Hours

12 Hours

Data, features, Preprocessing on data, Cleaning of data, Feature selection techniques like Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Components of Analytics - reporting and analysis

Unit 2: Handling Data Sources

Different types of data sources: structured, unstructured and semi-structured data, Relational databases: normal forms, transactional data, Structured Query Language (SQL), NoSQL databases and its types, Handling semi-structured data with JSON, CSV files, XML and more

Unit 3: Exploratory Data Analysis (EDA), Models and Techniques

Working with trend detection, outlier detection, summarization, association rule mining, missing distribution and imputation technique, spurious relationship or spurious correlation, concept of performance window, missing trends or percentile distribution from time perspective and concept of winsorization or flooring, Regression models: linear and non-linear, logistic, variable transformation, spinning of variables, population stability index and characteristic analysis, Regularization, overfitting and underfitting, mean square error, root mean square error, mean absolute percentage error, Decision tree classification, support vector machine, k-means clustering, usage of clustering techniques in variable selection

Unit 4: Reporting Fundamentals

Anatomy and types of reports, Top-down approach: Drill down reports and dashboards, Bottom-up approach: analysis and prediction with ad-hoc queries, Strategies and techniques for effective reporting: best practices

Unit 5: Reports for Data Analysis & Data Reporting Tools

Descriptive analysis and its reports: Key Performance Indicator (KPI) dashboards and periodic reports. Diagnostic analysis and detailed drill down reports, Predictive analysis and reports based on predictive models, Prescriptive analysis and reports based on AI/ML models. Graphs and Charts: types and implementation, Tables: varieties and its usage in standard reports, Dashboards and drill down reports, Interactive reports, Report generation best practices based on case studies.

Total Hours: 60

Text Book TCS ion

213BCS3127	213BCS3127 APPLIED CLOUD COMPUTING				X 0	C 5				
Course Category	Course Category: Discipline Specific Elective									
Course Type : In	Course Type : Integrated Course - Theory									

PREREQUISITE

Basic concepts of any DBMS software is required for this course.

COURSE OBJECTIVES

- To articulate the main concepts, key technologies, strengths, and limitations of cloud computing
- To learn how to use Cloud Services.

• To implement Virtualization

COURSE OUTCOME(S)

CO1: Understand the basics of information technology and security techniques.

CO2: Identify the security functional requirements.

CO3: Apply the security assurance requirements.

CO4: Analyze and validate the protection profile and target the criteria of security.

CO5: Apply the Security evaluation techniques.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						
CO5						

UNIT – I: INTRODUCTION TO THE CLOUD

Evolution of information technology (IT) and business computing models, Definition of cloud computing, business drivers for the cloud, Essential characteristics, Cloud computing vs cluster computing vs grid computing, Cloud computing architecture, Service and deployment models, Benefits, risks and challenges of cloud computing

UNIT – II: CLOUD COMPUTING STACK & CLOUD SERVICES

Comparison with traditional computing architecture (client/server), Services provided at various levels, types of cloud services - public, private and hybrid, Role of networks in cloud computing, Service models (XaaS), Deployment models - public cloud, private cloud, hybrid cloud, community cloud, Infrastructure as a service (IaaS), Platform as a service (PaaS),Software as a service (SaaS)

UNIT – III: SERVICE MANAGEMENT IN CLOUD COMPUTING

Service management - service level agreements (SLAs), billing and accounting, Service improvement and roadmap

UNIT – IV: CLOUD SECURITY

Infrastructure security, Network level security, Host level security, Application level security, Data security and storage Jurisdictional issues - data location identity, Access management, access control trust, reputation, risk authentication in cloud computing

UNIT - V: CASE STUDIES

Kubernetes (K8s) - Amazon Web Services (AWS) Database Migration Service - cloud extract, transform, load (ETL), Amazon SageMaker - platform to build, train and deploy machine learning models quickly, Cloud-based analytic databases - Amazon Redshift, Snowflake and Google BigQuery

Text Book:

1. Mastering Cloud Computing"- Foundations and Applications Programming, Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, , MK publications, 2013.

- 2. Enterprise Cloud Computing: Technology, Architecture, Applications, Gautam Shroff by Cambridge University Press, 2010.
- 3. Cloud computing a practical approach Anthony T.Velte, Toby J. Velte Robert Elsenpeter TATA McGraw-Hill, New Delhi, 2010.
- 4. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller – Que, 2008.
- 5. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010.
- 6. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011.
- 7. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.
- 8. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, WileyIndia, 2010.

GROUP IV

213BCS3128		L	Т	Р	X	С
	CONVERSATIONAL EXPERIENCES	4	4 0 2 0	0	5	
Course Category : D Course Type : Integr	iscipline Specific Elective rated Course - Theory					

COURSE OBJECTIVES

This course is designed for practitioners, who already have some practical experience with conversation design and would like to deepen and systematize their knowledge as well as for professional Product Designers and UX Designers, who would like to transition into this new field.

UNIT - I: Fundamentals of Conversational Systems & Foundational Blocks for Programming

Introduction, General chatbot architecture, Underlying technologies, Introduction to popular chatbot frameworks and channels, An overview of ethical and legal considerations in Artificial Intelligence (AI) Basic Python programming concepts, Node basics, Coding best practices

UNIT – II: Natural Language Processing (NLP)

Introduction, Lexical knowledge networks, Lexical, syntactic and semantic analysis, part-of-speech tagging, word sense disambiguation, Information extraction, sentiment analysis, NLP using Python, Application of NLP in chatbots

UNIT – III: Building Chatbots/Conversational AI Systems

Fundamentals of conversational systems, Chatbot framework and architecture, conversational flow and design, intent classification, dialogue management strategies, Natural Language Generation (NLG), Introduction to top players in market, Smart speakers, Security and ethics, Building a voice/chatbot, Affective NLG, Conversational question answering

UNIT – IV: Artificial Intelligence (AI), Machine Learning (ML) & Computer Vision in Conversational Technologies

Recap of ML and AI concepts, Voice Translation, Emotion analysis, Text Search solutions for conversational systems. Introduction, Libraries, development platforms, and datasets, Image filtering and transformations, convolutional neural networks, object detection, segmentation and tracking, 3D computer vision, mathematics for computer vision, ML for computer vision, Introduction to OpenCV, Building a vision bot

UNIT – V: Contact Centres & Conversational Analytics and Testing

Introduction to contact centres, Case studies and trends. Conversational Analytics and Testing-Conversational analytics, User level Testing of Conversational Experiences (CE) systems, Testing frameworks in CE. Future - Where Are We Headed? Summary, An overview of robots and sensory

applications, Extended Reality (XR) technologies in conversational systems, XR-Commerce, An overview of future technologies and market innovations

Total Hours: 60

Text Book

TCS ion

213BCS3129	DATA MINING & WARE HOUSING		Т 0	P 2	X 0	C 5		
Pre-requisite: Basic	Pre-requisite: Basic algebra							
Course Category: D	Course Category: Discipline Specific Elective							
Course Type: : Integ	grated Course - Theory							

Unit I Data Preprocessing & Data Warehouse

Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data eduction. A Multidimensional Data Model, Data Warehouse Architecture

Unit II Association Rule Mining

Frequent Itemset Mining, Mining Various Kinds of Association Rules

Unit III Classification and Prediction

Various Classification Methods, Various Prediction Method

Unit IV Cluster & Outlier Analysis

Partitioning Methods, Hierarchical Methods, Density-Based Methods Distance Based Outlier Detection, Density-Based Local Outlier Detection

Unit V Mining Data Streams, Text Mining & Spatial Data Mining

Mining Time-Series Data, Mining Sequence Patterns in Biological Data Text Retrieval Methods, Text Indexing Techniques, Query Processing Techniques Spatial Classification and Spatial Trend Analysis, Spatial Clustering Methods

Total Hours: 60

Text Book:

TCS ion

213BCS3130	ADVANCED CYBER SECURITY - AN ADVANCED APPROACH	L	Т	Р	X	С		
		4	0	2	0	5		
Course Category: Discipline Specific Elective Course Type : Integrated Course - Theory								

PREREQUISITE

Cyber Security Fundamentals

COURSE OBJECTIVES

• To introduce the basic concepts of cyber security

- To acquire knowledge on cyber threats and attacks
- To become aware of significant security technologies and tools
- To impart knowledge on cipher methods and cryptographic algorithms
- To explore various protocols for establishing secured communication

COURSE OUTCOME(S)

CO1: Understand the basic concepts, need, approaches, principles and components of security.

CO2: Explain the various cyber threats and attacks.

CO3: Describe the various Security Technologies and Tools.

CO4: Apply the knowledge to Measure the performance and troubleshoot cyber security systems.

CO5: Explore the significant aspects of cyber security.

Mapping of Course Outcome(s):

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						
CO5						

UNIT – I: Data, Application and Endpoint Security

Importance of application security, Open Web Application Security Project (OWASP) top 10 web application, vulnerabilities, Secure Software Development Life Cycle (SSDLC) Data security, data security controls, Endpoint security, host/endpoint security

UNIT - II: Identity and Access Management (IAM)

Authorization, authentication, Access control, access control models, Privilege levels, IAM lifecycle, identity and access management process and activities

UNIT – III: Phases of a Cyber Attack

Reconnaissance: adversary identifies and selects a target, Weaponize: adversary packages an exploit into a payload designed to execute on the targeted computer/network, Deliver: adversary delivers the payload to the target system, Exploit: adversary code is executed on the target system, Install: adversary installs remote access software that provides a persistent presence within the target environment system, Command and control: adversary employs remote access mechanisms to establish a command and control channel with the compromised device, Act on objectives: adversary pursues intended objectives such as data exfiltration, lateral movement to other targets

UNIT – IV: Security Processes in Practice for Businesses

Key security business processes, Corporate security governance, IT strategy management, Portfolio, program, project management, Change management, Supplier (third-party management), Problem management, Knowledge management, Information security management, Business Continuity Planning (BCP), IT operations management, Overview of top 20 security controls

12

UNIT – V: Information Security Standards

Information security standards - need, ISO/IEC 27000 standard series, ISO/IEC 27001, ISO/IEC 27002, ISO/IEC 27005,ISO/IEC 27006, SP 800 standard series, SP 800 -12, Standard of Good Practice (SoGP), Control Objectives for Information and Related Technology (COBIT), BSI IT-Grundschutz baseline protection, BSI Standard 100-1,BSI Standard 100-2, BSI Standard 100-3

Total Hours: 60

12

Text Book:

- 1. Michael E. Whitman, Herbert J. Mattord," Principles of Information Security", CENGAGE Learning, 4th Edition.
- 2. William Stallings," Cryptography and Network Security Principles and Practice", Pearson Education, 7th Edition.
- 3. Atul Kahate," Cryptography and Network Security", Mc Graw Hill, 4th Edition.

GROUP V

	DESIGN THINKING	L	Т	Р	X	C
213BCS3131		3	0	2	0	4
Course Category: Discipline Specific Elective Course Type : Integrated Course - Theory						

COURSE OBJECTIVES

This course aims to immerse students into the world of innovation as a systematic process of tackling relevant business and/or social problems. Also provides social and thinking space for the recognition of innovation challenges and the design of creative solutions.

UNIT – I Design Thinking

Overview and introduction: what is design and what is design thinking, Design thinking process: discover and develop with your own process, A holistic scheme of things: the world, environment, humans and the product, Present time challenges, awareness and responsible design, The product form and the content

UNIT – II Recontextualising Design Problem/Brief

Overview and introduction: business goals and stakeholder mapping, Stakeholder interviews: business goals, vision and mission, Redefining design brief: areas of impact, Strategising and appropriation of products, gap/challenge assessment, Charting user study plan

UNIT – III User Studies Empathising

Overview and introduction: introduction to user studies, what is empathy, why does it matter, Research types and choice of method,Recruitment, preparation, ethics, social responsibility, User study methods, a comparative overview,Contextual inquiry: an introduction, User situation and context models, tips and tools, Supporting conceptual models, user models

UNIT – IV User Studies, Analysis and Synthesis

Overview and introduction: why do we interpret,Data filtering, analysis and interpretation techniques Creating data valid chain, challenging assumptions and biases, Interpreting data, belief systems and worldview, Learning from affinity, redefining focus, developing insights, Developing contextual conclusions, developing design response

UNIT – V Ideate Design ,Prototyping Design Solutions & Alignment with Business Goals, Aiming for Delivery 12

Overview and introduction: formulate design response, challenges as design opportunities, Archetype, personas, scenario building, user experience goals, Creativity tools, collaborative designing, Transformation,

69

12

12

12

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brainwriting methods, Product goals and profile, user experience goals, parameters and weightage, Perceptual appropriation of design solution, relevance and validity, Design implications, product positioning Sustainable design solution, standards, heuristics, affordance, principles, Overview and introduction: result synthesis, prioritising design opportunities, Prototyping tools and techniques, Prioritisation and perceptual mapping, Information architecture and design, Low and high fidelity prototypes, handling complexity with simplicity, Design Evaluation and Testing, Overview and introduction: convergence, techniques and tools overview, User experience metrics, planning and conducting user testing, Heuristic evaluation, Expert usability testing, Revisiting design criterion, preparing guidelines, recommendations, User perception evaluation, assessing visual response, Overview and introduction: goal alignment with design, Key Performance Indicators (KPIs) and risk prediction, Social responsibility and responsible design, Devising a preliminary implementation plan, What and how are we delivering: product, service, experience, Prelude to design research writing/reporting

Total Hours: 60

Text Book

TCS ion

	NATURAL LANGUAGE PROCESSING	L	Т	Р	X	C		
213BCS3132		3	0	2	0	4		
Course Category: Discipline Specific Elective Course Type : : Integrated Course - Theory								

COURSE OBJECTIVES

This course teaches the principles and methods of statistical natural language processing and provide handson experience of text analysis using Python. Processing text data is crucial in many domains such as computer science, journalism, social science, psychology, political science, etc.

UNIT – I Introduction

What is Natural Language Processing?, Building your Corpus; elements in balanced corpus, TreeBank, PropBank, WordNet, VerbNet, Tokenization, N-grams, Stemming and Lemmatization, Synsets and Hypernyms

UNIT - II Part of Speech tagging, Parsing & Semantics

Stochastic POS tagging, HMM, Transformation based tagging (TBL), Handling of unknown words, named entities, multi word expressions, Named Entity Recognition (NER), Unification, probabilistic parsing, TreeBank, Meaning representation, Semantic analysis, lexical semantics, WordNet

UNIT – III Word Sense Disambiguation and Discourse

Definition, Selectional restriction, machine learning approaches, dictionary based approaches, Reference resolution, constraints on co-reference , algorithm for pronoun resolution, text coherence, discourse structure

UNIT – IV Recent Advances and Applications

Sentiment Analysis, Machine Translation, Summarization, Multimodal Processing

UNIT – V Information Retrieval

Vector space model, homonymy, polysemy, synonymy, improving user queries, Different NLP related problems like named entity recognition, part of speech tagging, sentiment analysis, summarization, machine translation etc.

Total Hours: 60

Text Book

TCS ion

A12D (12122	SOCIAL MEDIA AND TEXT ANALYTICS	L	Т	Р	Χ	С	
213BC83133		3	0	2	0	4	
Course Category: Discipline Specific Elective							
Course Type :Integrated Course - Theory							

COURSE OBJECTIVES:

The main objective of the course is to utilize various Application Programming Interface services to collect data from different social media sources, process the collected data, analyze unstructured data, use different tools for collecting, analyzing, and exploring social media data for research and development purposes.

UNIT-1 Introduction to Course

Introduction to information retrieval, Inverted indices and Boolean queries, Processing unstructured and semi-structured data. Example queries using Apache Solr

UNIT-II Text Processing

Text Processing I - Text encoding, tokenization, lemmatization and stop words, Proximity and phrase queries, Positional indices, Examples using common Python libraries, Index compression, lexicon compressing and posting list compression, Gap encoding, gamma codes, Zipf's law.

Text Processing II- Query expansion, Query processing fundamentals, Automatic thesaurus generation, Spelling correction and synonyms, N-gram,Edit distance, Practical experiments with query expansion

UNIT-III Text Analytics

Text classification techniques, Topic model fundamentals, Document-term matrix, Latent Dirichlet Allocation (LDA), Latent Semantic Indexing (LSI), Other topic modeling algorithms, Practical aspects of topic model tuning

UNIT-1V Social Media Data Processing

Social media data basics, Classification of social data, Modeling of social data, How to collect data - with case studies. Social media as big data, Database for modeling

UNIT-V Social Media Analytics

Fact finding from social data, Sentiment and opinion analysis, Sampling data using database, Sample case study with publicly available data, Python tools for text classification, Summary of the course

Total Hours: 60

12

12

12

12

Text Book TCS ion
SKILL ENHANCEMENT COURSES

GROUP I

214BCS3207	C# PROGRAMMING		Т	Р	X	C		
			0	4	0	2		
Pre-requisite: OOPs Concepts,C++ Programming								
Course Category: Skill Enhancement Elective								
Course Type: Practical								

COURSE OBJECTIVES

This course is designed to provide the knowledge of Dot Net Frameworks along with C#.

COURSE OUTCOMES

On the completion of the course, students will be able to: **CO1:** To understand the f the structure and model of the programming language C #. **CO2:**Use the features of Dot Net Framework along with the features of C#

CO3: To develop, implement and creating Applications with C#.

MAPPING OF COURSE OUTCOME(S)

				PO			
0/10	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L	М	S	
CO3		S		L		Μ	

LIST OF EXPERIMENTS

Total: 45 Hours

- Define a class Student, which contains the following information about students: full name, course, subject, university, e-mail and phone number. Declare several constructors for the class Student, which have different lists of parameters (for complete information about a student or part of it). Data, which has no initial value to be initialized with null. Use nullable types for all non-mandatory data. Add a method in the class Student, which displays complete information about the student. Generate the IL code for the above mentioned class independently. Compile the multiple classes' IL into single executable file.
- Create a class Call, which contains information about a call made via mobile phone. It should contain information about date, time of start and duration of the call. Add a property for keeping a call history

 CallHistory, which holds a list of call records. In GSM class add methods for adding and deleting

calls (Call) in the archive of mobile phone calls. Add method, which deletes all calls from the archive. In GSM class, add a method that calculates the total amount of calls (Call) from the archive of phone calls (CallHistory), as the price of a phone call is passed as a parameter to the method.

- 3. Create a class Session, which can store the details of user into session while user get logged into the application. The session must have implement an indexer to fulfill the requirement. User can retrieve the details by providing the index name into the session object.
- 4. Implement a program that takes a positive integer from the console and prints the square root of this integer. If the input is negative or invalid print "Invalid Number" in the console. In all cases print "Good Bye".
- 5. Write a method ReadNumber(int start, int end) that reads an integer from the console in the range [start...end]. In case the input integer is not valid or it is not in the required range throw appropriate exception. Using this method, write a program that takes 10 integers a1, a2, ..., a10 such that 1 < a1 < ... < a10 < 100</p>
- 6. Implement a program that takes as a parameter the name of a text file, reads the file and returns its content as string. What should the method do if and exception is thrown?
- 7. Implement a program that takes as a parameter the name of a binary file, reads the content of the file and returns it as an array of bytes. Write a method that writes the file content to another file. Compare both files.
- 8. A company pays its employees on a weekly basis. The employees are of four types:
 - 1. Salaried employees are paid a fixed weekly salary regardless of the number of hours worked,

2. Hourly employees are paid by the hour and receive overtime pay for all hours worked in excess of 40 hours

3. Commission employees are paid a percentage of their sales

4. Salaried-Commission employees receive a base salary plus a percentage of their sales.

For the current pay period, the company has decided to reward salaried commission employees by adding 10% to their base salaries. The company wants to implement a C# application that performs its payroll calculations polymorphically.

- a. Identify and declare all the properties of an employee with suitable constraints, e.g. Age could not be less than 18 years and not exceeds than 60 years.
- b. Salary of a salaried employee won't be exceeded Rs. 20000 per week and not less than Rs.4000 per week. The joining of an employee would not be less than Rs.4000 per week. Every year salaried employees get an increment of 10%.
- c. Hourly Employee cannot work less than 30 hrs. in a week and not more than 50 hrs. in a week. Minimum and maximum payment is Rs. 200 and 400 per hour respectively.

- d. The commissioned Employees' commission cannot exceed Rs. 20000 in a week. The commission on per article sale is 10%, which is fixed.
- e. No one employee can earn more than Rs. 25000 per week.
- 9. Implement the Code in C# to Display the index of a searched item from an array using Delegates.
- 10. Implement the Code in C# to display the elements of an array using Delegates
- 11. Implement the Code in C# to sort and display the elements of an array (use Bubble Sort Algorithm) using Anonymous Method.
- 12. Implement the Code in C# to search an Item from an array using Lambda Expression. The array and Lambda are in distinct class. Lambda Expression return the value either true/false.
- 13. Classes to be implemented in C# and perform the following actions in classes. Employee { ID, Name, Address, salary } Student {Rollno, Name, Course, Fees }

Implement the following functionality into the custom list program.

- a. Add(T): to add an employee/student at the last of the list
- b. Find(DelegateMethod): to find an employee/Student from a given list and return the first matched employee/Student.
- c. FindAll(DelegateMethod): to find all employee/Student from a given list and return the all matched employee/Student(s).
- d. FindIndex(DelegateMethod): to find an employee/Student from a given list and return the index of matched employee/Student.
- e. IndexOf(T): to find a T from a given list and return the index of first matched T.
- f. LastIndexOf(T): to find a T from a given list and return the last occurrence index of matched T
- 14. Classes to be implemented in C# and perform the following actions in classes. class Student{Roll,Name,Score,City} class Faculty{ID, Name, Salary, City}
 - a) Write a C# Program to display the all Faculties details whose salary is greater than 5000 from a List< Faculty > using LINQ.
 - b) Write a C# Program to display the all Faculties and Students details who lived in same City using LINQ join

Total Hours: 30

	SOFTWARE TESTING LAB	L	Т	Р	X	С		
214BCS3201	SOFTWARE TESTING LAD	0	0	4	0	2		
Course Category: Skill Enhancement Elective Course Type : Practical								

COURSE OBJECTIVES

- To learn about different type of applications and testing, along with the purpose of automation testing.
- To gain insight into the evolution of Selenium
- To get an overview of Selenium nd its components and compare commonly used automation tool with Selenium automation tools.
- Explore the features and use of Selenium-WebDriver
- To record and importing tests with Selenium IDE
- To learn data driven testing using TestNG

COURSE OUTCOMES :

- 1. Understand Selenium Architecture and its components
- 2. Work with Selenium RC
- 3. Understand Selenium WebDriver
- 4. Use WebDriver advanced features e.g. taking screenshots, handling cookies and managing exceptions
- 5. Create Data driven, Keyword driven and Hybrid test framework
- 6. Record and importing tests with Selenium IDE andWrite Test cases using TestNG

MAPPING OF COURSE OUTCOME(S):

CO/P	PO	PO	PO	PO	PO	PO
0	1	2	3	4	5	6
CO1	S				W	
CO2		S				
CO3			М	S		
CO4			S			
CO5	Μ				S	S

Unit I - INTRODUCTION TO AUTOMATION

Planning before Automation - Introduction to Selenium - Installing Selenium Components.

Unit II - USING SELENIUM IDE

Managing User Interface Controls - Basics of Java- Creating First Selenium Web Driver Script.

Unit III- SELENIUM METHODS

Common Selenium Web Driver Methods - Verification Point in Selenium - Exploring the Features of Web Driver.

Unit IV- HANDLING POP-UP DIALOGS AND MULTIPLE WINDOWS

Working with Dynamic UI Objects- Data driven testing using TestNG - Selenium Functions, Common Questions and Tips.

Unit V- REPORTING IN SELENIUM

Batch Execution- Automation Frameworks - Understanding Selenium Grid.

LIST OF PROGRAMS

- 1. Write a test case based on controls.
- 2. Test data in a flat file.
- 3. Manual test case to verify student grade

4. Write and test a program to select the number of students who have scored more than 60 in any one subject(or all Subjects)

- 5. Write and test a program to login a specific web page.
- 6. Write and test a program to get the number of list items in a list / combo box.
- 7. Test a HTML file.
- 8. Test a program in MS Excel for Data Driven Wizard.
- 9. Test the addition of two values in C++ Program

TEXT BOOKS

1. AdithyaGarg, Ashish Mishra "A Practitioner's Guide to Test Automation Using Selenium", Tata McGraw Hill Education, 2015

TOTAL: 30 Hrs

GROUP II

21 AD CR2202			Т	Р	Χ	C
214BC85205	.NET PROGRAMMING	0	0	4	0	2
Pre-requisite: Basic kn Course Category: Ski Course Type: Practical	owledge in Programming ll Enhancement Electives	3		<u> </u>		

COURSE OBJECTIVES

- To understand the .NET frameworks
- To understand the object oriented programming concepts in an .Net technology

COURSE OUTCOMES

CO 1: Able to learn visual basic .Net from basics to file handling

CO 2: Able to understand the various windows controls

CO 3: Able to learn the ASP .Net and ADO.Net.

MAPPING OF COURSE OUTCOME(S):

	РО									
0/10	1	2	3	4	5	6	7			
1.		S				S				
2.		S	L	L		S				
3.		S		L		М				

LIST OF EXPERIMENTS

Total: 45 Hrs

BLOCK 1: .NET FRAMEWORK

- 1. Programs using variables, constants and data types
- 2. Programs using arrays and dynamic arrays
- 3. Program using control flow statement

BLOCK 2 : VISUAL BASIC.NET

- 4. Programs using functions and procedures, MDI forms, events
- 5. Programs using msgbox, inputbox, dialog boxes, working with multiple forms
- 6. Anchoring and docking controls, event handling, RichTextBoxes

BLOCK 3 : WINDOWS CONTROLS

7. Programs using windows common controls

- 8. Programs using menus, built in dialog boxes, Image list, tree and list views
- 9. Programs using toolbars, statusbars, progressbars, tab controls, graphics and file handling

BLOCK 4 : ASP.NET

- 10. Writing ASP programs using HttpRequest and HttpResponse
- 11. Develop an application for ASP web controls, list controls, validation and rich controls, Data controls
- 12. Develop an application for HTML server controls, custom controls, logging and error handling

BLOCK 5 : ADO.NET

- 13. Database applications using ADO.NET
- 14. Accessing a database using SQL commands, Data binding controls, DataList

Total Hours: 30

TEXT BOOK

- Visual Basic .Net programming, Steve Holzner, Dreamtech press.
- The complete reference for ASP.Net, Mathew macdonald, TMH

REFERENCE BOOK

• Visual Basic .Net programming Bible, Bill Evjen, JasonBeres, Wiley dreamtech press.

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214BCS3204

MOBILE APPLICATION DEVELOPMENT LABORATORY

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Course Category: Skill Enhancement Elective **Course Type**: Practical

COURSE OBJECTIVES:

- To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to:

CO1: Develop mobile applications using GUI and Layouts.

CO2: Develop mobile applications using Event Listener.

CO3: Develop mobile applications using Databases.

CO4: Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.

CO5:Analyze and discover your own mobile app for simple needs.

LIST OF EXPERIMENTS

- 1. Develop an application that uses GUI components, Font and Colours
- 2. Develop an application that uses Layout Managers and event listeners.
- 3. Write an application that draws basic graphical primitives on the screen.
- 4. Develop an application that makes use of databases.
- 5. Develop an application that makes use of Notification Manager
- 6. Develop a native application that uses GPS location information
- 7. Implement an application that writes data to the SD card.
- 8. Implement an application that creates an alert upon receiving a message
- 9. Develop a mobile application to send an email.
- 10. Develop a Mobile application for simple needs (Mini Project)

TOTAL: 30 PERIODS

REFERENCES:

1. Build Your Own Security Lab, Michael Gregg, Wiley India

GROUP III

21/10/153208	SCRIPTING LANCHACES		Т	Р	Χ	С			
214DC55206	SCRII III LANGUAGES	0	0	4	0	2			
Prerequisites: Any Hig	h-level programming language (C, C++)		I						
Course Category: Skill	Course Category: Skill enhancement elective								
Course Type: Practical									

Course Objectives

- To Understand the concepts of scripting languages for developing web-based projects
- To understand the applications the of Ruby, TCL, Perl scripting languages

Course Outcomes

- Ability to understand the differences between Scripting languages and programming languages
- Able to gain some fluency programming in Ruby, Perl, TCL

List of Experiments

- 1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
- 2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.
- 3. Write a Ruby script which accept the user's first and last name and print them in reverse order with a space between them
- 4. Write a Ruby script to accept a filename from the user print the extension of that
- 5. Write a Ruby script to find the greatest of three numbers
- 6. Write a Ruby script to print odd numbers from 10 to 1
- 4. Write a Ruby scirpt to check two integers and return true if one of them is 20 otherwise return their sum
- 8. Write a Ruby script to check two temperatures and return true if one is less than 0 and
- 9. the other is greater than 100
- 10. Write a Ruby script to print the elements of a given array
- 11. Write a Ruby program to retrieve the total marks where subject name and marks of a
- 12. student stored in a hash
- 13. Write a TCL script to find the factorial of a number
- 14. Write a TCL script that multiplies the numbers from 1 to 10
- 15. Write a TCL script for Sorting a list using a comparison function

- 16. Write a TCL script to (i)create a list (ii)append elements to the list (iii)Traverse the
- 17. list (iv)Concatenate the list
- 15. Write a TCL script to comparing the file modified times.
- 16. Write a TCL script to Copy a file and translate to native format.
- 17. a) Write a Perl script to find the largest number among three numbers.
 - c) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
- 18. Write a Perl program to implement the following list of manipulating functions
 - a. Shift
- 18. R16 B.TECH CSE.
 - b) Unshift
 - c) Push
- 19. a) Write a Perl script to substitute a word, with another word in a string.
- 20. b) Write a Perl script to validate IP address and email address.
- 21. Write a Perl script to print the file in reverse order using command line arguments

Total Hours: 30

		L	Т	Р	X	С			
214BCS3206	ROBOTIC PROCESS AUTOMATION	0	0	4	0	2			
Pre-requisite: Basic	Pre-requisite: Basic knowledge on data mining concepts								
Course Category: Skill Enhancement Elective									
Course Type: Practical									

COURSE OBJECTIVES

- Explain the concepts of Robotic Process Automation
- Explain the process methodologies for BOT development
- Apply knowledge about the BOT development for intelligent automation

COURSE OUTCOME(S)

CO1: Define the key concepts of Robotic Process Automation, evolution and demonstrate development of BOT with specific tools

CO2: Examine specifications of RPA tools and justify applications of appropriate tool for problem.

CO3: Assess performance of BOTs in context of intelligent automation

CO/PO	РО								
	1	2	3	4	5	6	7		
CO1		S	М			S			
CO2	S			S			S		
CO3		М	S		S	М			

MAPPING OF COURSE OUTCOME(S):

LIST OF EXPERIMENTS

- 1. Software Installation Procedure Installation of AA Control Room, SQL Server and AA Client.
- 2. Bot Creation using recorders (Smart, Web and Screen).
- 3. Bot Creation using command library (Loop Command).
- 4. Bot Creation to invoke database automation
- 5. Bot Creation for automating excel operations
- 6. Bot Creation for PDF Integrations.
- 7. Bot Creation and working on error handling.
- 8. Bot Development using Object Cloning Command.
- 9. FTP and PGB Command Execution by Bots
- 10. MetaBot Designing with AI Sense.

TOTAL: 45 PERIODS