


APPENDIX H

 <p>GANPAT UNIVERSITY ॥ विद्यया समाजोत्कर्षः ॥</p>	<h1 style="margin: 0;">GANPAT UNIVERSITY</h1>								
FACULTY OF COMPUTER APPLICATIONS									
Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A1GUI		Subject Name		GUI PROGRAMMING				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50
Objective:									
To learn the fundamentals of web developing. This course provides a practical hands-on introduction to developing Web applications using ASP.NET Core MVC with C#. Acquiring sufficient knowledge on role of Model, View and Controller in integrating them to develop complete web application Access databases and performing CRUD operations using LINQ and Entity Framework.									
Pre-requisites:									
The student should have a good working knowledge of HTML and the .NET Framework. Basic knowledge of ASP.NET WebForms is recommended.									
Learning Outcome:									
After completing this course, students should be able to:									
<ul style="list-style-type: none"> ✓ Students will able to achieve basic web page developing with C# language and deploying website. ✓ Get to know the concepts of ASP.NET core MVC and build a new static web page using HTML, CSS, and jQuery ✓ Create a Controller with action methods. ✓ Build a view using several features of the Razor View engine. ✓ Construct a Model for ASP.NET Core MVC application. ✓ Develop complete web application Access databases and performing database operations using LINQ and Entity Framework. 									
Content:									
Unit									Hrs
	SECTION – I								
1	C#.Net Console I/O: Reading Console Input, Writing Console Output, Using ReadKey() Program Control Statements: Conditional Statements (if, switch), Looping Statements (for, while, do-while, foreach), Jump Statements (break, continue, goto, return)								12

	<p>Arrays and Strings: One Dimensional Arrays, Multi-Dimensional Arrays, Jagged Array, Using Strings</p> <p>OOP's Concepts: Define Classes and Objects, Methods, Access Modifiers, Constructor, Destructor, Inheritance, Polymorphism (Overloading and Overriding), Collections (ArrayList, Hashtable), Exception Handling</p> <p>LINQ to Objects: Introduction to LINQ, LINQ Query Syntax, LINQ Query Operators, LINQ Query Methods</p>	
2	<p>ASP.NET Core ASP.NET Core Introduction, Razor Syntax, Create a Razor Pages web app, Add a model to a Razor Pages app, Scaffold (generate) Razor pages, Work with a database, Update Razor pages, Add search, Add a new field, Add validation</p> <p>Razor Pages with Entity Framework Core Get started, Create, Read, Update, and Delete operations, sorting, filtering, paging, and grouping</p>	10
SECTION – II		
3	<p>ASP.NET Core MVC ASP.NET Core MVC Introduction, ASP.NET Core - MVC Design Pattern, Routing, Attribute Routes, Action Results, Razor Layout Views, Create a web app with ASP.NET Core MVC, Add a controller, Add a view, Add a model, Work with SQL Server LocalDB, Controller methods and views, Add search, Add a new field, Add validation, Examine the Details and Delete methods</p>	12
4	<p>ASP.NET Core MVC with Entity Framework Core Get started, Create, Read, Update, and Delete operations, Sorting, filtering, paging, and grouping, Migrations, Create a complex data model, Reading related data, Updating related data</p>	11
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	The Complete Reference C# 4.0, Herbert Schildt, Tata McGraw Hill Edition	
2	ASP.NET Core Essentials, Shahed Chowdhuri	
3	ASP.NET Core 2.0 MVC and Razor Pages for Beginners	
4	Pro ASP.NET Core MVC, Adam Freeman, Apress	
5	Pro Entity Framework Core 2 for ASP.NET Core MVC, Adam Freeman, Apress	
Web Reference:		
1	https://docs.microsoft.com/en-us/aspnet	
Question Paper Scheme:		
<p>University Examination Duration: 3 Hours Note for Examiner: - (I) Questions 1 and 4 are compulsory with no options. (II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I Q.1 –8 Marks</p>		

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks

FACULTY OF COMPUTER APPLICATIONS

Program	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A2JP		Subject Name		JAVA PROGRAMMING				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50
Objective:									
<ul style="list-style-type: none"> Students will be able to use OOPS concepts along with implementation. Also students will be able to build windows and web based applications. 									
Pre-requisites:									
<ul style="list-style-type: none"> Students should have fundamentals concepts of object-oriented programming in Java, including defining classes, invoking methods, exception handling, using class libraries, etc. 									
Learning Outcome									
:									
Students are able to									
<ul style="list-style-type: none"> Use java collection framework and libraries Develop GUI desktop application using swing and JDBC Develop web applications using Servlet, jsp and JDBC Develop web applications using MVC Frameworks and JDBC 									
Content:									
Unit									Hrs
	SECTION – I								
1	Multithreaded Programming: Life cycle of Thread, Thread class & Runnable Interface, Multiple Thread, Thread methods and priorities, synchronization using synchronized method and synchronized statement Stream Classes and Stream I/O : ByteStream: InputStream, OutputStream, FileInputStream, FileOutputStream, ByteArrayInputStream, ByteArrayOutputStream, CharacterStream: Reader, Writer, File Reader, File Writer, BufferedReader, BufferedWriter								15
2	Java Collection Framework & Libraries : Collection Framework Introduction; Java ArrayList; Java LinkedList; Java List Interface; Java HashSet; Java LinkedHashSet; Java TreeSet; Java Map Interface; Java Hashtable; Java								07

	EnumSet; Java Collections class; Sorting Collections	
SECTION – II		
3	<p>Web applications using Servlet, jsp and JDBC:</p> <p>Servlet : Basic of web, servlet API,GenericServlet,HttpServlet,Servlet Life Cycle,servletRequest method,RequestDispatcher,sendRedirect,Reading Form Data from Servlets,Session Tracking:Cookies,Hidden Form field,URL Rewriting,HttpSession</p> <p>JSP : Life cycle of JSP,JSP API,Scriptlet Elements,Implicit Objects,Directive Elements,Action Elements</p> <p>JDBC : JDBC Overview & Architecture ,JDBC Driver Types, Types of ResultSet , Statement, PreparedStatement, CallableStatement ,Executing DDL and DML Commands</p>	12
4	<p>Complete web applications using MVC Frameworks and JDBC:</p> <p>JSF Framework Services, Message Bundles, Bean Scopes, Static Navigation, Dynamic Navigation, Panels, The Head, Body, and Form Tags, Text Fields and Text Areas, Buttons and Links, At least five Selection Tags, The Data Table Tag–h:dataTable, A Simple Table, Headers, Footers, and Captions, Editing Tables, Database Tables, Overview of the Conversion and Validation Process, Using Standard Converters, Using Standard Validators, Events and the JSF Life Cycle, Value Change Events, Using database CRUD operations like INSERT, UPDATE, DELETE, SELECT with java server faces</p>	11
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	The Complete Reference Java 2 By Herbert Schildts, Tata McGraw-Hill Edition	
2	Core Servlets and Java Server Pages By Marty Hall and Larry Brown, PEARSON Education	
3	Programming with Java, A Primer by E. Balagurusamy Tata McGraw-Hill Edition	
4	Thinking in Java, Bruce Eckel , Prentice Hall, President, MindView, Inc.	
5	The class of Java By Pravin Jain, Pearson Education	
6	Murach’s Beginning Java By Andrea Steel man, BPB Publications	
7	Teach Yourself JAVA By Joseph O’Neil & Herb Schildts, Tata McGraw-Hill	
8	Cay S. Horstmann “Core Java , Volume I – Fundamentals”, Pearson Education	
9	Cay S. Horstmann “Core Java , Volume II – Advanced Features”, 10th Edition, Pearson Education	
10	Core Java Server Faces By David Geary and Cay Horstmann, PEARSON Education	
11	The Complete Reference Java Server Faces By Ed Burns and Chris Schalk, Tata McGraw- Hill	
Web Reference:		
1	https://docs.oracle.com/javase/tutorial/	
2	https://www.javatpoint.com/java-tutorial	
Question Paper Scheme:		
	<p>University Examination Duration: 3 Hours</p> <p>Note for Examiner: -</p> <p>(I) Questions 1 and 4 are compulsory with no options.</p> <p>(II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I</p> <p>Q.1 –8 Marks</p> <p>Q.2 –11 Marks</p> <p>Q.3 –11 Marks</p>	

	SECTION - II
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	Q.4 –8 Marks
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	Q.5 –11 Marks
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	Q.6 –11 Marks
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FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A3WD2		Subject Name		Elective-I Web Designing-II				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50

Objective:

Student can develop rich and responsive, cross browser supported website with client side storage

Pre-requisites:

Create basic HTML and CSS files and use them to create web pages

Learning Outcome:

Students are able to

- Use java script in form validation, DOM manipulation and BOM manipulation
- Use AJAX and JSON in web applications
- Use Bootstrap for responsive web applications

Content:

Unit		Hrs
	SECTION – I	
1	<p>JavaScript Programing Structure</p> <p>Where To use, JS Output, JS Statements, JS Comments, JS Variables, JS Operators, JS Arithmetic, JS Assignment, JS Functions, JS Objects, JS Events, JS Strings, JS Numbers, JS Arrays, JS Dates, JS Date Get Methods, JS Date Set Methods, JS Booleans, JS Comparisons, JS Conditions, JS Switch, JS Loop For, JS Loop While, JS Break</p> <p>JS Forms</p> <p>JS Forms Validation</p> <p>JS Objects</p> <p>Object Definitions, Object Properties, Object Methods</p> <p>JS Functions</p> <p>Function Definitions, Function Parameters, Function Invocation</p> <p>JS HTML DOM</p> <p>DOM Intro, DOM Methods, DOM Elements, DOM HTML, DOM CSS, DOM Events, DOM Event Listener, DOM Navigation, DOM Nodes, DOM Collections, DOM Node Lists</p>	22

	JS Browser BOM JS Window, JS Screen, JS Popup Alert, JS Timing, JS Cookies	
SECTION – II		
2	JS AJAX AJAX Intro, AJAX XMLHttpRequest, AJAX Request, AJAX Response, AJAX with PHP JS JSON JSON Intro, JSON Syntax, JSON Data Types, JSON Parse, JSON Stringify, JSON Objects, JSON Arrays Bootstrap Controls Grid Basics, Typography, colors, Tables, Images, Jumbotron, Alerts, Buttons and ButtonGroups, Badges, Progress Bars, Spinners, Pagination, List Groups, Cards, Dropdowns, Collaps, Navs, forms, Inputs, Input Groups, Carousel, Tooltip, Icons Bootstrap Grid System BS4 Grid System, BS4 Stacked/Horizontal, BS4 Grid XSmall, BS4 Grid Small, BS4 Grid Medium, BS4 Grid Large, BS4 Grid XLarge	23
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	HTML 5 Developer's Cookbook , By Chuck Hudson, Tom Leadbetter	
2	Bootstrap By Jake spurlock ,O'RELLY	
Web Reference:		
1	https://www.w3schools.in/	
2	https://www.w3schools.com/	
Question Paper Scheme:		
	University Examination Duration: 3 Hours Note for Examiner: - (I) Questions 1 and 4 are compulsory with no options. (II) Internal options should be given in questions 2, 3, 5 and 6. SECTION - I Q.1 –8 Marks Q.2 –11 Marks Q.3 –11 Marks SECTION - II Q.4 –8 Marks Q.5 –11 Marks Q.6 –11 Marks	

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year			2019-20		Effective for the batch Admitted in			June 2018	
Subject Code	P13A3NET		Subject Name		Elective – I Networking				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50

Objective:

To get knowledge about different types of network devices and network concept and layer of network. Understand the concept of security related network.

Pre-requisites:

Basic knowledge of computer

Learning Outcome:

Students will be able to understand, how data is sent from one device to another with layer technology and security, protocols.

Content:

Unit		Hrs
	SECTION – I	
1	<p>BASIC CONCEPT OF COMPUTER NETWORK</p> <p>Uses of Computer Networks, Types of Computer Network (LAN, MAN, WAN), Intranet, Extranet and Internet, Network Topologies: Star, Ring, Bus, Tree, Mesh, and Hybrid, OSI reference Model & TCP / IP Reference models: Functions of Each Layer, Name of the Main Protocols in each layer, Difference between OSI Model & TCP/IP model</p> <p>PHYSICAL LAYER</p> <p>Guided Media – Twisted Pair, Coaxial Cable – Baseband and Broadband, Fiber Optics cable and network, Different Connectors: RJ45, RG 59, RG 58, RG 11, BNC AND Cables CAT 5, CAT 5E, CAT 6, Unguided Media – Radio wave, Micro wave, Infrared, Geo Synchronous Satellite Communication, Bluetooth technology, Transmission Impairments – Noise, Attenuation and Distortion, Bandwidth, frequency, Wavelength, Line Configuration, Network Interface card, Media Converter, Connecting Devices: Repeater, Difference between Hub, Switch and Router, Bridge, Gateway, Modem</p> <p>DATA LINK AND MEDIUM ACCESS SUB LAYER</p>	22

	Physical and Logical Address, IPV 4 and IPV 6, Framing and Frame Format, Introduction to Flow control, Error Control, Channel Allocation: Static Channels Allocation and Dynamic Channel Allocation, Multiplexing & De Multiplexing- FDM, TDM and WDM, IEEE Standards: IEEE 802.3: Ethernet – Standard, Fast, Gigabit and Ten Gigabit Ethernet, Frame Format of Ethernet, IEEE 802.4: Token Bus, IEEE 802.5: Token Ring, Introduction to Polling and ALOHA.	
SECTION – II		
2	<p>NETWORK AND TRANSPORT LAYER</p> <p>Universal Identifier, Classes of Network, IP Addressing, special addresses, Subnet Masking, Supernet. Delivery and Routing of IP Packets, Routing Table, Routing Methods (Next-Hop, Network specific, Host specific, Default routing), Static Vs Dynamic routing, Introduction to Routing Algorithms : Shortest Path Routing, Flooding, Flow Based Routing, Distance Vector Routing, Broadcast Routing (Routing for Mobile Hosts), Connection oriented Vs Connectionless services, Direct Vs Indirect Delivery, TCP & UDP, and Difference between TCP & UDP, Dynamic Host Configuration Protocol –DHCP Scope, DHCP Lease Mechanism.</p> <p>UPPER LAYER</p> <p>Overview of Cryptography: Encryption, Decryption, Plain Text, Cipher Text And Various Techniques of Cryptography, Introduction to Secret-key (private key) and Public-key, Digital Signature ,Introduction to Firewall, Domain Name System – Its purpose and how it works, Overview of different Application layer protocols and their use (Rlogin, Telnet, FTP, TFTP, SNMP & SMTP).</p> <p>PRACTICAL APPROACHES</p> <p>Remote Assistance & Desktop Sharing, Net meeting Configuration (Team Viewer), Crimping, Firewall Configuration, Wi-Fi router Configuration, Manageable Switch Configuration, Server Configuration: Creating workgroup, domain and active directory</p>	23
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	Data Communications and Networking by Behrouz Forouzan Tata McGraw Hill	
2	Computer Networks by Andrew S. Tanenbaum Pearson Edition	
Web Reference:		
1		
2		
Question Paper Scheme:		
	<p>University Examination Duration: 3 Hours</p> <p>Note for Examiner: -</p> <p>(I) Questions 1 and 4 are compulsory with no options.</p> <p>(II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I</p> <p>Q.1 –8 Marks</p> <p>Q.2 –11 Marks</p> <p>Q.3 –11 Marks</p> <p>SECTION - II</p>	

	Q.4 –8 Marks Q.5 –11 Marks Q.6 –11 Marks
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FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A4COM		Subject Name		Computer Based Optimization Models				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	-	-	3	Theory	40	60	100
Hours	2	1	-	-	3	Practical	-	-	-

Objective:

It helps students to find the optimum solution for better decision making.

Pre-requisites:

Basic knowledge of Mathematics.

Learning Outcome:

Student can apply the various operation research methods to find optimum solution.

Content:

Unit		Hrs
	SECTION – I	
1	<p>Operation Research:An Introduction History,Definition, scope and phases of operations research, Models and Modeling in OR, Methodology and Applications of OR, Computer software for Operation Research</p> <p>Linear Programming Linear Programming, Structure and Assumption of Linear Programming, Mathematical Form of General LPP, Formulation of an LPP, Slack, Surplus and Artificial Variables, Standard Form of LPP, Solution of an LPP using Graphic Method and Simplex Method, Two-Phase and Big-M Method, Special cases in LPP: Alternate Optimum solution, An Unbounded Solution, Infeasible Solutio</p> <p>Transportation Problem Mathematical Model of Transportation problem, Methods to find initial basic feasible solution, North-West corner method(NWCM), Least Cost Method(LCM), Voggel's approximation method, Method for finding optimal solution – MODI method, Special cases in Transportation Problem.</p> <p>Replacement Models</p>	22

	Introduction, Types of Failure, Replacement of items whose efficiency deteriorates with time: Model I: Replacement policy for items whose running cost increases with time and value of money remains constant during a period, Model II: Replacement policy for items whose running cost increases with time but value of money changes with constant rate during a period.	
SECTION – II		
2	<p>Assignment Problem Introduction, Mathematical Model, Method to find an optimal solution- Hungarian Method, Variations in assignment problem- multiple optimal solutions, Maximization case in assignment problem, Unbalanced assignment problem, restrictions on assignment</p> <p>Sequencing Problem Introduction to sequencing problems- Processing n jobs through two machines, processing n jobs through three machines, Processing n jobs through m machines, processing two jobs through m machines</p> <p>Project Management PERT and CPM: Introduction, Basic Difference between PERT and CPM, Phases of Project Management, PERT / CPM Network Components and Precedence Relationship, Critical Path Analysis-Forward Pass Method , Backward Pass Method , Float of an Activity and Event, Critical Path, Time estimation and Critical Path in Net-Work Analysis</p> <p>Theory of Games Introduction, Two – Person Zero Sum game, Pure strategies (Minimax&Maximinprinciples) Games with saddle point, Rules to determine saddle point.</p> <p>Simulation Nature and meaning of simulation, types of simulation, advantages and disadvantages of simulation.</p>	23
Practical Content:		
N.A.		
Reference Books:		
1	Operation Research: Theory and Application By J. K. Sharma- McMillan	
2	Introduction to Operation Research By K.K. Chawla, Vijay Gupta, bhushan Kumar.	
Web Reference:		
1		
2		
Question Paper Scheme:		
	<p>University Examination Duration: 3 Hours Note for Examiner: - (I) Questions 1 and 4 are compulsory with no options. (II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I Q.1 –8 Marks</p>	

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A4QAL		Subject Name		Elective-II QUANTITATIVE APTITUDE AND LOGICAL REASONING				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	1	-	-	3	Theory	40	60	100
Hours	2	1	-	-	3	Practical	-	-	-
Objective:									
To prepare students to face aptitude tests as part of selection criteria for IT industries									
Pre-requisites:									
Basic Knowledge of Mathematics up to 10th standard									
Learning Outcome:									
The student will acquire more knowledge and skill to face any aptitude test conducted by IT Industry.									
Content:									
Unit									Hrs
SECTION – I									
1	Operations on Numbers, H.C.F. & L.C.M of Numbers, Decimal Fractions Face value & Place Value, Types of numbers, Even & Odd numbers, Prime numbers, Tests of divisibility, Factors & Multiples, HCF or GCM or GCD, LCM, Product of HCF & LCM, Co primes, HCF & LCM of Fractions, Conversion of Decimal into Vulgar Fraction, Operations & Comparison on decimal fractions, Recurring Decimal, Basic Formulae for decimal fractions								5
2	Simplification of Numbers, Square Roots & Cube Roots BODMAS Rule, Modulus of a real number, Virnaculum, ;Facts and Formulae of square roots and cube roots								3
3	Average, Problems on Numbers, Problems on Ages Facts and Formulae of Average, Analyze given conditions, Assume unknown numbers, Form equations, Find out ages from given conditions								5
4	Percentage Concept of Percentage, Express x% as fraction, Express a/b as percent, Results on Population, Result on Depreciations								3
5	Profit & Loss, Ration & Proportion Cost price, Selling price, profit and loss formulae, What is ration, what is proportion,								6

	Fourth proportion, Third proportion, Mean proportion, Comparison of ratio, Compounded ration, Componendo and dividendo, variation	
SECTION – II		
6	Partnership, Chain Rule Concept of partnership, Ration of Division of gains, Working and sleeping partners, Direct proportion, Indirect proportion	6
7	Time & Work, Time & Distance Facts and formulae for time and work, Facts and formulae for time and distance	4
8	Simple Interest Concept of principal, concept of interest, Facts and formulae for simple interest,	3
9	Permutation & Combinations Factorial notation, Number of permutations, Number of combinations, Facts and formulae of permutation and combinations	3
10	Probability Experiment and Random experiment, Sample space, Probability of Occurrence of an event, Results on probability,	4
11	Odd Man Out & Series Facts, exercises and solutions for odd man out, Facts, exercises and solutions for series problems	3
Reference Books:		
1	QUANTITATIVE APTITUDE for competitive examinations by Dr.R.S. Aggarwal, S. CHAND publication	
2	QUANTITATIVE APTITUDE for competitive examinations by ABHIJIT GUHA, Mc Graw Hill Education	
3	GENERAL INTELLIGENCE AND TEST OF REASONING, Vikas Publishing House	
Question Paper Scheme:		
	<p>University Examination Duration: 3 Hours Note for Examiner: - (I) Questions 1 and 4 are compulsory with no options. (II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I Q.1 –8 Marks Q.2 –11 Marks Q.3 –11 Marks</p> <p>SECTION - II Q.4 –8 Marks Q.5 –11 Marks Q.6 –11 Marks</p>	

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A5ML1		Subject Name		ELECTIVE-III FUNDAMENTAL OF DATA SCIENCE				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50
Objective:									
To familiarize students with the basic statistical methods and tools.									
To understand data visualization methods and tools used.									
To summarize and analyze quantitative information for decision making									
Pre-requisites:									
Basic Knowledge of Mathematics									
Learning Outcome:									
After completing this course, students should be able to:									
<ul style="list-style-type: none"> ✓ Students will be able to understand data types such as cross-sectional data, time series data and panel data. ✓ Understand uncertainty and how probability concepts are used for measuring and modelling uncertainty. ✓ Understand various discreet distributions for solving business problems. ✓ Learn fundamentals of simple linear regression and its applications in predictive analytics. ✓ Understand application of simple linear regression model in predictive analytics problems. ✓ Learn various data visualization techniques for making Decision ✓ Learn to make Dashboard for on-click visual representation of data. 									
Content:									
Unit	SECTION – I								Hrs
1	Basics of Statistics Data Types, Structured and unstructured data, Cross-sectional data, time series data and Panel data, Types of Data Measurement scale, Nominal scale, Ordinal Scale, Interval Scale and Ratio Scale. Measures of Central Tendency; Mean value, Median Value, Mode . Percentile, Decile and								12

	Quartile. Measures of Variation; Range, Inter-Quartile Distance, Variance, Standard Deviation. Measures of Skewness and Kurtosis	
2	Introduction to Probability Theory Probability theory terminology, Random experiment, Sample Space, Event, Probability Estimation, using relative frequency, Joint probability, Marginal Probability, independent events, Conditional probability. Application of simple probability rules- Association Rule learning. Bayes' theorem, Solving Monty Hall Problem using Bayes' Theorem. Random variables, Discrete Random variables, Continuous Random Variables. Probability mass function and Cumulative distribution function(CDF) of a Discrete and Continuous Variable. Probability distributions (Normal Distribution, Binomial Distribution and Poison Distribution)	11
SECTION – II		
3	Correlation and Regression Analysis Correlation Analysis, Pearson Correlation Coefficient, Spearman Rank Correlation, Point Bi-Serial Correlation, The Phi-coefficient. Simple Linear Regression, History of Regression, Simple Linear Regression Model Building, Estimation of Parameters using Ordinary Least Squares, Interpretation of Simple Linear Regression Coefficients, Validation of Simple Linear Regression Model, Outlier Analysis, Confidence Interval for the expected value of Y for a given X, Multiple Linear Regression, Multiple Linear Regression Model Building, Partial and semi-Partial correlation, Interpretation of MLR Coefficients, Regression model with Qualitative variables, Validation of Multiple Regression Model, Residual analysis in Multiple Linear Regression, Distance measures and outliers diagnostics, Variable Selection in Regression Model Building, Avoiding Overfitting, Transformations	12
4	Data Visualization and Case studies Histogram, Bar Chart, Pie Chart, Scatter Plot, Coxcomb Chart, Box and Whisker Plot, Treemap. Introduction to Dashboards, Benefits of using dashboard, creation of dashboards. Case Studies related to fundamental of Data Science.	10
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	Kumar, U. D. (2017). <i>Business Analytics: The Science of Data-driven Decision Making</i> . Wiley India.	
2	Sancheti, D. C., & Kapoor, V. K. (2007). <i>Statistics: Theory. Methods and Applications</i> , Sultan Chand & Sons, New Delhi.	
3	Knaflic, C. N. (2015). <i>Storytelling with data: A data visualization guide for business professionals</i> . John Wiley & Sons.	
4	Gupta, S.P., "Statistical Methods," Sultan Chand & Sons, 2004	
5	Business Statistics by J. K. Sharma	
Web Reference:		
1	https://www.youtube.com/watch?v=RM8T1eYBjQY	
2	https://www.edx.org/learn/statistics	
Question Paper Scheme:		
	University Examination Duration: 3 Hours Note for Examiner: - (I) Questions 1 and 4 are compulsory with no options. (II) Internal options should be given in questions 2, 3, 5 and 6.	

SECTION - I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A5BDA1		Subject Name		ELECTIVE – III BIG DATA ANALYTICS - I				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50

Objective:

To learn the Injecting data into Hadoop also build and maintain reliable, scalable, distributed systems with Hadoop. Understand the Big Data Platform and its Use cases. This course provides an overview of Apache Hadoop, HDFS Concepts and Interfacing with HDFS, Understand Map Reduce Jobs. To understand the Apache Hadoop architecture and knowledge on variety of NoSQL databases and how to work in MongoDB. Apply analytics on Structured, Unstructured Data.

Pre-requisites:

The student should have a good working knowledge of Object Oriented programming concepts, Java, RDBMS any of the Linux operating system flavors.

Learning Outcome:

After completing this course, students should be able to:

- ✓ Students will to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
- ✓ Students will be able to write Map-Reduce based Applications
- ✓ Students will learn difference between conventional SQL query language and NoSQL basic concepts.
- ✓ Students will learn tips and tricks for Big Data use cases and solutions.
- ✓ Students will be get basic idea to work in MongoDB.

Content:

A. Big Data Architecture & Ecosystem – Hadoop

Unit		Hrs
SECTION – I		
1	Introduction to BigData: Introduction to BigData and its importance, Evolution of Big Data, Concepts and Terminology : Datasets, Data Analysis, Data Analytics, Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics, Business Intelligence (BI), Key Performance Indicators (KPI), Big Data Characteristics : Volume, Velocity, Variety, Veracity, Value, Different Types of Digital Data : Structured Data, Semi-	12

	Structured data, Unstructured Data, Difference between Structured, Semi-structured and Unstructured data, BigData Architecture.	
2	<p>Big Data Adoption and Analysis Techniques : Drivers for Big Data Adoption: Marketplace Dynamics, Business Architecture, Business Process Management, Information and Communications Technology: Data Analytics and Data Science, Digitization, Affordable Technology and Commodity Hardware, Social Media, Hyper-Connected Communities and Devices, Cloud Computing, Internet of Everything (IoE), Big Data Analytics Applications Types. Big Data Analysis Techniques: Quantitative analysis, Qualitative analysis, Data mining, Statistical analysis, Machine learning, Semantic analysis, Visual analysis, Case studies</p>	11
SECTION – II		
3	<p>Introduction to HADOOP: Introduction to Hadoop and its Features, The Hadoop Ecosystem, Hadoop core components of the Hadoop ecosystem, Different Hadoop Distributions, Developing Enterprise Applications with Hadoop. Storing Data in HDFS: Introduction HDFS (Hadoop Distributed File System) , HDFS Architecture, HDFS core components: NameNode and DataNode, Blocks, Data Replication, Using HDFS Files, Hadoop-Specific File Types, HDFS Federation and High Availability, Anatomy of File Read and Write in Hadoop, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce, Data Serialization.</p>	12
4	<p>Map Reduce & Yarn: Introduction Map Reduce, The fundamentals: map() and reduce(), Characteristics of MapReduce, Real-time Uses of MapReduce, Data Locality. Map Reduce work Process: Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution. Hadoop Yarn: Introduction to Yarn, Hadoop Yarn Architecture, Introduction to Hadoop Yarn Resource Manager, Node Manager</p>	10
Practical Content:		
List of programs specified by the subject teacher based on above mentioned topics		
Reference Books:		
1	Thomas Erl ,”Big Data Fundamentals-Concepts, Drivers and Techniques”, Pearson publication,2016	
2	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”,Wiley, ISBN: 9788126551071, 2015	
3	Seema Acharya, Subhashini Chellappan, “ Big Data and Analytics”, Wiley India Pvt. Ltd.,2015	
4	Tom White,“Hadoop: The Definitive Guide”,O'Reilly Media,4th Edition,2015	
5	Vignesh Prajapati,“Big Data Analytics With R and Hadoop”, Packt Pub Ltd ,2013	
Web Reference:		
1	http://www.bigdatauniversity.com	
2	http://hadoop.apache.org/	
Question Paper Scheme:		
	University Examination Duration: 3 Hours Note for Examiner: -	

(I) Questions 1 and 4 are compulsory with no options.

(II) Internal options should be given in questions 2, 3, 5 and 6.

SECTION - I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject Code	P13A5CSF1		Subject Name		NETWORK SECURITY				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	1	2	-	5	Theory	40	60	100
Hours	2	1	4	-	7	Practical	20	30	50
Objective:									
To make aware students about network basics, protocols and idea of security									
Pre-requisites:									
Basic Information of Computer Networking and Communication, Unguided and Guided Media of Computer Network									
Learning Outcome:									
By the end of this module students should be able to									
<ul style="list-style-type: none"> Learn about computer network and its usability Understand various Network Communication Protocols. Acquired the knowledge of network security 									
Content:									
Unit									Hrs
SECTION – I									
1	Fundamental of Computer Network Network Types, Work group model VS Domain Model, Network Topologies, Types of Server, VLAN configuration in switch, wired and wireless Networks, OSI Model, TCP / IP Reference models, IEEE standards, Firewall authentication.								10
2	Networking Host Layers: Application Layer: SIP, NNTP, FTP, HTTP, NFS, NTP, SMPP, SMTP, SNMP, Telnet, Presentation Layer: MIME, SSL, TLS, XDR, Session Layer: Sockets, Session establishment in TCP, RTP, PPTP, Transport Layer: SCTP, DCCP, UDP, TCP, TCP Connection Establishment and Termination								10
3	Networking Media Introduction: Network Layer: IPv4, IPv6, IP Address Classes, Subnet Masks and CIDR Networks								2
SECTION – II									

4	Networking Media Layers: IPsec, ICMP, IGMP, OSPF(Link State), Distance Vector(RIP), Data Link Layer: PPP, SBTV, SLIP, Physical Layer: X.25, wifi, Ethernet, FDDI	3
5	Computer Network Administration: Introduction to server Operating System, Linux Installation, Linux Commands, Linux Directory Structure, Mount and Un-mount devices, DNS, DNS forward lookup zone and reverse lookup zone, Managing User and Group, Introduction to DHCP, DHCP configuration, Group Policy , Logs introduction, log files(Messages, dmesg, Audit log)	10
6	Server Virtualization and Security Authentication Introduction to virtualization, virtualization Architecture, System Backup and recovery, Security Protocols, Security threads, overview of system troubleshooting, Understanding attack techniques, Firewall, mod_evasive, iptables, ssh security, tcpwrappers, SELinux, Wireshark and TCPdump, Server and client administration(LDAP, Kerberos, NIS), Process Management	10

Practical Content:

List of programs specified by the subject teacher based on above mentioned topics

Reference Books:

1	TCP/IP Protocol suite B.A. Forouzan
2	Microsoft server 2008: beginner's guide Marty Matthews published by McGraw hill
3	Linux Bible Edition 8 By Christopher Negus and Christine Bresnaham Publication Wiley-India
4	Fedora Bible 2010 Edition: Featuring Fedora Linux 12

Question Paper Scheme:

University Examination Duration: 3 Hours

Note for Examiner: -

(I) Questions 1 and 4 are compulsory with no options.

(II) Internal options should be given in questions 2, 3, 5 and 6.

SECTION - I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications				Branch/Spec.	Master of Computer Applications			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	June 2018			
Subject code	P13A5CC1		Subject Name		FUNDAMENTAL OF CLOUD COMPUTING				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	1	2	-----	5	Theory	40	60	100
Hours	2	1	4	-----	7	Practical	20	30	50
Objectives									
Students can understand and hands on the fundamental concepts of cloud computing such as architecture of cloud computing, cloud deployment models, cloud service models with case study.									
Pre-requisites:									
Operating System Concepts, Computer Network Concepts, Programming concepts									
Learning Outcome									
Students successfully completing this course will be able to: Fundamentals of computing paradigms and cloud computing, Understand the cloud architecture and types Understand the service and deployment models of cloud, Private cloud establishment, Work on public and private cloud for various services like IaaS, PaaS and SaaS, Build and Deploy the application on the public and private cloud, Understand cloud service management and cloud security									
Theory syllabus									
Unit	Content								Hrs
SECTION – I									
1	Computing Paradigms Distributed Computing, Peer-to-Peer Computing, Cluster Computing, Utility Computing, Grid Computing, Cloud Computing								5
2	Cloud Computing Basics Cloud Computing – Introduction: Features and Applications, Challenges and Issues, Characteristics of Cloud Computing Cloud Computing – Planning: Strategy Phase, Planning Phase, Deployment Phase								6
3	Cloud Computing – Architecture and Infrastructure Cloud Computing – Architecture: Front End, Back End Cloud Computing – Infrastructure: Hypervisor, Management Software, Deployment Software, Network, Server, Storage Cloud Computing - Infrastructural Constraints: Transparency, Scalability, Intelligent Monitoring, Security								5
4	Cloud Deployment Models Public Cloud Model, Private Cloud Model, Hybrid Cloud Model, Community Cloud Model								6
SECTION – II									

5	Cloud Service Models: IaaS, PaaS, SaaS Infrastructure as a Service (IaaS): Introduction to Infrastructure, Virtual machines, Virtualization, Hypervisors, Server virtualization, Resource provisioning, Scaling, Implementation of IAAS, Applications, Issues and Challenges, Dockers and containers	5
6	Platform as a Service (PaaS): Introduction to various platforms, Characteristics, PaaS architecture, Containers, Application staging, Implementation of PaaS, Issues, Application Development and Deployment using PaaS.	5
7	Software as a Service (SaaS): Introduction to services, web services, APIs, Service management, Implementation of SaaS, Characteristics, Applications and Issues. Introduction, Web services, Web 2.0, Web OS, Examples, How to implement SAAS	5
8	Case study Distributed File System, HDFS, and Cloud Implementation using Open Stack.	8
Reference Books		
1	Barrie Sosinsky: "Cloud Computing Bible", Wiley-India, 2010	
2	RajkumarBuyya, James Broberg, Andrzej M. Goscinski: "Cloud Computing: Principles and Paradigms", Wiley, 2011	
3	Nikos Antonopoulos, Lee Gillam: "Cloud Computing: Principles, Systems and Applications", Springer, 2012	
Web References		
1	https://www.tutorialspoint.com/cloud_computing/	
2	https://www.javatpoint.com/cloud-computing-tutorial	
3	https://www.w3schools.in/cloud-computing/	
4	https://www.tutorialride.com/cloud-computing/cloud-computing-tutorial.htm	
Question Paper Scheme:		
<p>University Examination Duration: 3 Hours</p> <p>Note for Examiner: -</p> <p>(I) Questions 1 and 4 are compulsory with no options.</p> <p>(II) Internal options should be given in questions 2, 3, 5 and 6.</p> <p>SECTION - I</p> <p>Q.1 –8 Marks</p> <p>Q.2 –11 Marks</p> <p>Q.3 –11 Marks</p> <p>SECTION - II</p> <p>Q.4 –8 Marks</p> <p>Q.5 –11 Marks</p> <p>Q.6 –11 Marks</p>		