

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

M.Tech- Information Technology

(Dept of Information Technology)

CURRICULUM and SYLLABI

[For students admitted in 2023-2024]

PG Regulations 2023

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)

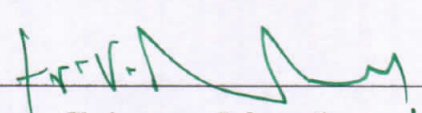
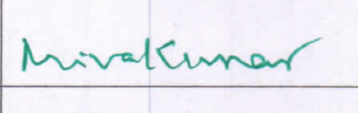

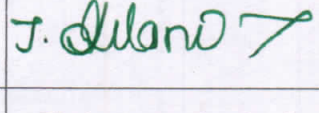
Courses of Study for M.TECH Semester I under Regulations 2023(CBCS)
Branch: M.Tech -Information Technology

IT

S. No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type	
Theory Courses											
1	P23MAT101D	Mathematics for Data Analytics	3	1	0	0	4	FC	60	T	
2	P23MIT101	Full Stack Development	3	0	0	0	3	PC	45	T	
3	P23MIT102	Advanced Data Structures	3	0	0	0	3	PC	45	T	
4	P23GE101	Research Methodology and IPR	3	0	0	0	3	PC	45	T	
5	P23MIT515	Elective : Agile Software Development	3	0	0	0	3	PE	45	T	
6	P23GE701	Audit Course – English for Research Paper Writing	2	0	0	0	0	AC	30	T	
Practical Courses											
7	P23MIT103	Advanced Data Structures Laboratory	0	0	4	0	2	PC	60	L	
8	P23MIT104	Full Stack Development Laboratory	0	0	4	2	3	PC	90	LP	
Total Credits							21				

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

Approved By

			
Chairperson, Information Technology BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

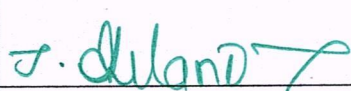
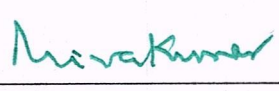
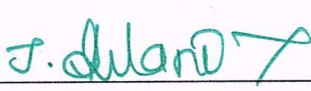
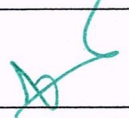
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Courses of Study for M. Tech Semester II under Regulations 2023(CBCS)
Branch: M. Tech -Information Technology

S. No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type	
Theory Courses											
1	P23MIT201	Machine Learning	3	0	0	0	3	PC	45	T	
2	P23MIT202	Cyber Security	3	0	0	0	3	PC	45	T	
3	P23MIT203	Big Data Technologies	3	0	0	0	3	PC	45	T	
4	P23MIT501	Elective: Internet of Things	3	0	0	0	3	PE	45	T	
5	P23MIT518	Elective: Multimedia communication	3	0	0	0	3	PE	45	T	
6	P23GE702	Audit Course – Stress Management by Yoga	2	0	0	0	0	AC	30	T	
Practical Courses											
7	P23MIT204	Machine Learning Laboratory	0	0	4	2	3	PC	90	LP	
8	P23MIT205	Big Data Technologies Laboratory	0	0	4	0	2	PC	60	L	
Total Credits							20				

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Approved By

			
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Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

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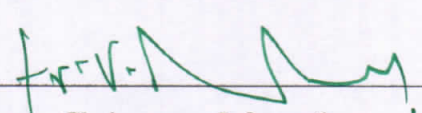
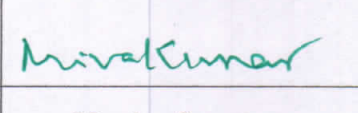

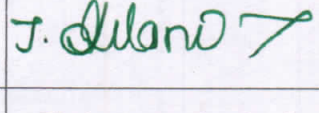
Courses of Study for M.TECH Semester I under Regulations 2023(CBCS)
Branch: M.Tech -Information Technology

IT

S. No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type	
Theory Courses											
1	P23MAT101D	Mathematics for Data Analytics	3	1	0	0	4	FC	60	T	
2	P23MIT101	Full Stack Development	3	0	0	0	3	PC	45	T	
3	P23MIT102	Advanced Data Structures	3	0	0	0	3	PC	45	T	
4	P23GE101	Research Methodology and IPR	3	0	0	0	3	PC	45	T	
5	P23MIT515	Elective : Agile Software Development	3	0	0	0	3	PE	45	T	
6	P23GE701	Audit Course – English for Research Paper Writing	2	0	0	0	0	AC	30	T	
Practical Courses											
7	P23MIT103	Advanced Data Structures Laboratory	0	0	4	0	2	PC	60	L	
8	P23MIT104	Full Stack Development Laboratory	0	0	4	2	3	PC	90	LP	
Total Credits							21				



*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

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INFORMATION TECHNOLOGY					
M. Tech. / INFORMATION TECHNOLOGY					
SEMESTER - I	MATHEMATICS FOR DATA ANALYTICS				
P23MAT101D	L	T	P	J	C
	3	1	0	0	4
Course Outcomes					
At the end of the course, the student will be able to					
CO1:	apply the concept of correlation, fit suitable curve to the given data and analyse the result.				
CO2:	apply the concepts of probability, random variable, moments, moment generating function and their properties to solve the problems.				
CO3:	analyse the characteristics of the estimators, find the estimate of the parameters using maximum likelihood estimation and method of moments.				
CO4:	test the hypothesis about the population using Z, t, F and χ^2 -test statistics.				
CO5:	apply the multivariate analysis concept to analyse the given set of data which involves more than one variable.				
Pre-requisites:					
<ul style="list-style-type: none"> Basics of elementary algebra Basics of calculus 			<ul style="list-style-type: none"> Basics of geometry Basics of statistics and probability 		
CO/PO, PSO Mapping					
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak					
Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)					
COs	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	3
CO2	3	3	2	3	3
CO3	3	3	2	3	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3
Course assessment methods [Theory]					
Direct			Indirect		
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory) Assignment / Problem- solving / Seminar (10)			Total CIE: 40 marks Semester End Examination: 60 marks		Course end survey
Unit 01	CORRELATION, CURVE FITTING AND REGRESSION				12 Hours
Simple and rank correlations – multiple and partial correlations – curve fitting – principle of least squares – fitting a straight line – fitting a parabola – fitting an exponential curve – fitting a curve of the form $y = ax^b$ – linear regression – multiple and partial regressions.					
Unit 02	PROBABILITY AND RANDOM VARIABLE				12 Hours
Axioms of probability – conditional probability – total probability – Baye's theorem – random variable – probability mass function, probability density function, moments, moment generating function and their properties.					

Unit 03	ESTIMATION THEORY				12 Hours
Estimators – unbiasedness, consistency, efficiency and sufficiency (definitions and simple problems only) – maximum likelihood estimation – method of moments.					
Unit 04	TESTING OF SIGNIFICANCE				12 Hours
Parameter and statistic – null and alternative hypothesis – errors in sampling, critical region and level of significance – one tailed and two tailed tests – large sample tests for proportions, mean, difference between means, standard deviation – t -test for single mean, difference between means – Paired t -test – χ^2 -test for independence of attributes, goodness of fit – F -test.					
Unit 05	MULTIVARIATE ANALYSIS				12 Hours
Random vectors and matrices – mean vectors and covariance matrices – multivariate normal density and its properties – principal components: population components from standardized variables.					
Theory: 45 Hrs		Tutorial: - 15 Hrs	Practical:	Project:--	Total Hours: 60 Hrs
TEXT BOOKS:					
1.	S. C. Gupta and V. K. Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons Publishers, 11 th Edition (Reprint), 2019.				
2.	R. A. Johnson and D. W. Wichern, “Applied Multivariate Statistical Analysis”, Pearson Publishers, 6 th Edition, 2015.				
REFERENCE BOOKS:					
1.	J. L. Devore, “Probability and Statistics for Engineering and the Sciences”, Thomson and Duxbury Publishers, 9 th Edition, 2015.				
2.	R. A. Johnson and C. B. Gupta, “Miller and Freund’s, Probability and Statistics for Engineers”, Pearson Publishers, 9 th Edition, 2018.				
 Dr. S. JAYABHARATHI ASSOCIATE PROFESSOR & HEAD DEPARTMENT OF MATHEMATICS, SONA COLLEGE OF TECHNOLOGY, SALEM-636 005. Tamilnadu. Ph: 0427 - 4099999.			 Dr. M. RENUGA, Professor & Head, Department of Humanities & Languages, Sona College of Technology, SALEM - 636 005.		
HoD / Mathematics			BoS – Chairperson / Science and Humanities		

P23MIT101	FULL STACK DEVELOPMENT	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Design a front end of web application using HTML and CSS.
CO2:	Write a JavaScript code to validate the user data and asynchronously invoke backend application.
CO3:	Design a front end of web application using Bootstrap.
CO4:	Develop a front end of web application using a React JS library and make a call to server-side programs.
CO5:	Develop a back end of web application using Node JS, Express framework, and Mongo DB with CRUD operations in MongoDB and deploy web application in Cloud.

Pre-requisite: HTML, CSS, and JavaScript

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)							
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	
CO1		2	2	3	2		1	
CO2	2	3	3	3			2	
CO3		2	2	2	3		1	
CO4		3	3	3	3		2	
CO5	2	3	3	3	2	1	2	

Course Assessment methods

Direct	Indirect
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60	Course end survey

Unit 01: HTML and CSS **9 Hours**

Introduction to www, HTML: Tags, Lists, Images, Forms, Links, Tables, iframes, videos, anchors, HTML Divs – CSS: Inline, Internal, External, CSS Display, CSS Backgrounds, Borders, Margins, Padding, CSS Font Styling, Stylings Lists, Tables, Forms.

Unit 02: JAVA SCRIPT AND jQuery **9 Hours**

Introduction to Javascript, Variables, scoping, Data type, Strings, Numbers, Operators, Loops, Functions, Objects, Events, Working with DOM, AJAX, ES5 vs ES6 Vs ES7, jQuery – Introduction to jQuery, Syntax, Selectors, Events, Effects, Traversing, and jQuery AJAX.

Unit 03: BOOTSTRAP **9 Hours**

Introduction to Bootstrap, Bootstrap Basics – Container, Color, Table, Images, Alerts, Buttons, Badges, Bars, Spinner, Cards, Pagination, Drop down, Carousel, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, Bootstrap JS.


Unit 04: REACT JS **9 Hours**

Introduction to React, Install node, JSX, Virtual DOMs, Single Page Apps, React Lifecycle, States, Class Component Vs Function Component, Event Handling, Props, Routes, Hooks, Conditional rendering, Pure


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Components, High order components, Controlled Vs uncontrolled components, Redux, Babel, webpack, Axios.				
Unit 05: NODE.JS, EXPRESS, MONGO DB AND APPLICATION DEPLOYMENT IN CLOUD				9 Hours
Introduction, Environmental setup, Simple Server, Response Type – HTML, JSON, Routing, Express Introduction, Express params and query string, Express Middleware, API Authentication, SQL Vs NO SQL, Mongo DB overview, Installation, connecting and performing CRUD operations - Introduction to Cloud – Deploy a web application using IBM Cloud and AWS cloud.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
REFERENCES				
1.	Eric Bush, “Node.Js, MongoDB, React, React native Full Stack Fundamentals and Beyond”, Blue sky productions, 2019.			
2.	B. Jakobus, J. Maraj, “ Mastering Bootstrap 4”, Packt publisher, 2016.			
3.	Kirupa Chinnathambi, “Learning React”, Addison-Wesley Professional, 2018.			
4.	Marc Wandschneider, “Learning Node.js: A Hands-on guide to building web applications in javascript”, 2 nd edition, 2018.			


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P23MIT102	ADVANCED DATA STRUCTURES	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Design data structures and algorithms to solve computing problems.
CO2:	Implement and analysis of hierarchical data structures and algorithms.
CO3:	Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
CO4:	Apply suitable design strategy for problem solving.
CO5:	Implement approximation algorithms.

Pre-requisite: NIL

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)							
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	
CO1	1		1	1		3	1	
CO2	2	1	1	2		3	1	
CO3	3	2	1	3	1	3	1	
CO4	2	1	1	3	1	3	1	
CO5	1	1	2	2	2		1	

Course Assessment methods

Direct	Indirect
CIE test I (10) ,CIE test II (10),CIE test III (10) Assignment/Problem-solving/seminar (10) Total CIE Marks: 40, Semester End Examination Marks: 60	Course end survey

Unit 01: ROLE OF ALGORITHMS IN COMPUTING **9 Hours**


Algorithms – Algorithms as a Technology- Insertion Sort – Analyzing Algorithms – Designing Algorithms- Growth of Functions: Asymptotic Notation – Standard Notations –Divide and Conquer- Maximum-subarray problem- Strassen’s algorithm- Common Functions- Recurrences: The Substitution Method – The Recursion-Tree Method-The Master method.

Unit 02: HIERARCHICAL DATA STRUCTURES **9 Hours**


Binary Search Trees: Basics – Querying a Binary search tree – Insertion and Deletion- Red-Black trees: Properties of Red-Black Trees – Rotations – Insertion – Deletion- B-Trees: Definition of B trees – Basic operations on B-Trees – Deleting a key from a B-Tree- Fibonacci Heaps: Structure – Heap operations – Decreasing a key and deleting a node – Bounding the maximum degree.

Unit 03: GRAPHS **9 Hours**

Elementary Graph Algorithms: Representations of Graphs – Breadth-First Search – Depth-First


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Search – Topological Sort – Strongly Connected Components- Minimum Spanning Trees: Growing a Minimum Spanning Tree – Kruskal and Prim- Single-Source Shortest Paths: The Bellman-Ford algorithm – Single-Source Shortest paths in Directed Acyclic Graphs – Dijkstra’s Algorithm; All Pairs Shortest Paths: Shortest Paths and Matrix Multiplication – The Floyd-Warshall Algorithm.				
Unit 04: ALGORITHM DESIGN TECHNIQUES				9 Hours
Dynamic Programming: Matrix-Chain Multiplication – Elements of Dynamic Programming – Longest Common Subsequence- Greedy Algorithms: An Activity-Selection Problem – Elements of the Greedy Strategy – Huffman Codes NP COMPLETENESS AND APPROXIMATION ALGORITHMS.				
Unit 05: NP COMPLETENESS AND APPROXIMATION ALGORITHMS				9 Hours
NP-Completeness: Polynomial Time – Polynomial-Time Verification – NP-Completeness and Reducability – NP-Completeness Proofs – NP-Complete Problems- Approximation Algorithms: Vertex-Cover problem- Travelling-Salesman problem – Subset-sum problem.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
REFERENCES				
1.	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, “Introduction to Algorithms”, 4 th Edition, MIT Press, 2022.			
2.	Robert Sedgewick and Kevin Wayne, “Algorithms”, 4 th Edition, Pearson Education, 2011. .			
3.	Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data Structures and Algorithms”, 1st edition, Pearson Education.			
4.	Donald E Knuth, “Art of Computer Programming-Volume I- Fundamental Algorithms”, 3rd edition, Addison Wesley, 2022.			


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P23MIT103	ADVANCED DATA STRUCTURES LABORATORY	L	T	P	J	C
		0	0	4	0	2

Course Outcomes

At the end of the course, the student will be able to

CO1: Implement the tree data structure

CO2: Implement graph algorithms

CO3: Implement problems in greedy and approximation approach

Pre-requisite: NIL

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)							
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	
CO1	3	1	1	1	2	1	1	
CO2	3	2	1	1	3	2	1	
CO3	3	1	3	2	1	2	2	

Course Assessment methods

Direct	Indirect
CIE test I (20) ,Quiz I- (5) ,CIE test II (20),Quiz II- (5),RTPS (10) Total CIE: 60 marks , Semester End Examination (40 marks)	Course end survey

LIST OF EXPERIMENTS

1. Implementation of Binary Search Tree
2. Implementation of Fibonacci Heaps
3. Implementation of Red-Black tree
4. Implementation of Spanning Tree
5. Implementation of Shortest Path Algorithms
6. Implementation of Graph Traversals
7. Implementation of Greedy Algorithms
8. Implementation of Approximation Algorithms

Theory: --	Tutorial: --	Practical: 60 Hrs	Project: --	Total Hours: 60 Hrs
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P23MIT104	FULL STACK DEVELOPMENT LABORATORY					L	T	P	J	C
						0	0	4	2	3
Course Outcomes										
At the end of the course, the student will be able to										
CO1:	Design a Front End of application using HTML, CSS, BOOTSTRAP.									
CO2:	Write programs to validate data and initiate a call to backend using JavaScript code and jQuery.									
CO3:	Develop a Full Stack application using React JS, Node JS and Mongo DB and Deploy it in Cloud.									
Pre-requisite: HTML, CSS, and JavaScript										
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak										
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)									
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2			
CO1		2	2	2	2		1			
CO2	2	3	3	2	3		2			
CO3	2	3	3	3	2	1	2			
Course Assessment methods										
Direct										
Indirect										
CIE test I (10), Quiz-1 (5), CIE test II (10), Quiz-2 (5), CIE test III (Project) (10) Record (10), Total CIE: 50 marks, Semester End Examination (50 marks), SEE: Laboratory									Course end survey	
LIST OF EXPERIMENTS										
<ol style="list-style-type: none"> 1. Study of most popular full stack such as MEAN, PERN, LAMP and MERN. 2. Create your own Blog page using HTML/CSS. 3. Create a home page of your website using Bootstrap. 4. Add a functionality to your Blog using JavaScript and jQuery. 5. Create a front end of online assessment pages using React JS. 6. Build a Node.js server to say a given string is palindrome or not (Explore a node server with only API). <div style="margin-left: 40px;">input: localhost:8080/is_palindrome?text=madam output: true/false</div> 7. Node.js with MONGO DB (NodeJS with DB access). <ol style="list-style-type: none"> a) Create a database and insert the given data into the table. b) Fetch the record based by <ul style="list-style-type: none"> - joining the tables - Search criteria - recent data order - Limit first 5 records 										
<ol style="list-style-type: none"> 7. a) Whenever a user is logged in set the email in the MongoDB. b) Write a NodeJS script to pull the MongoDB email value which is set and provide as an API end 										

point.

8. Email

a) Build a script in NodeJS to send an email with a default content.

b) Use task '7-b' and integrate the task '8-a' to send an email to the user that they have logged in from this IP.

9. Create a back end of backend of online assessment using Node JS and Mongo DB.

10. Create a full stack application comprising React JS, Node JS, and Mongo DB to manage information of employees working in the organization. Admin of the application should able to perform CRUD operation on the employee database.

11. Deploy a Full Stack based web application into IBM Cloud.

12. Deploy a Full Stack based web application into AWS Cloud.


Theory: --

Tutorial: --

Practical: 60Hrs

Project: 30Hrs

Total Hours: 90 Hrs


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P23MIT515	AGILE SOFTWARE DEVELOPMENT	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Explain the genesis of Agile and driving forces for choosing Agile techniques.
CO2:	Comprehend the Agile Scrum framework and development practices.
CO3:	Assess the software product using Agile testing methodologies and perform testing activities within an Agile project.
CO4:	Apply software design principles and refactoring techniques to achieve agility.
CO5:	Evaluate the Agile approach impact on cutting-edge technologies and also realize the business value of adopting agile software development.

Pre-requisite: Software Engineering Process Models, Fundamentals of Programming Skills

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)							
	PO1	PO2	PO3	P04	PO5	PSO1	PSO2	
CO1	2	2	2	2	2		2	
CO2	2	2	1	3	1			
CO3	2	2	2	2	1	2	2	
CO4	3	3	3	1	1	2	3	
CO5	3	3	2	2	1	2	3	

Course Assessment methods

Direct	Indirect
CIE test I (10),CIE test II (10),CIE test III (10),Assignment/Problem-solving/seminar (10),Total CIE Marks: 40,Semester End Examination Marks: 60	Course end survey

Unit 01: FUNDAMENTALS OF AGILE	9 Hours
The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools	
Unit 02: AGILE SCRUM FRAMEWORK	9 Hours
Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management	
Unit 03: AGILE TESTING	9 Hours
The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester	
Unit 04: AGILE SOFTWARE DESIGN AND DEVELOPMENT	9 Hours

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Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Unit 05: INDUSTRY TRENDS

9 Hours

Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies

Theory: 45 Hrs

Tutorial: --


Practical: --

Project:--

Total Hours: 45 Hrs

REFERENCES

1.	Ken Schwaber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 2019.
2.	Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices" Pearson, 2013.
3.	Lisa Crispin, Janet Gregory," Agile Testing: A Practical Guide for Testers and Agile Teams" Addison Wesley, 2008.
4.	Alistair Cockburn," Agile Software Development: The Cooperative Game" Addison Wesley, second Edition, 2006.
5.	Mike Cohn," User Stories Applied: For Agile Software" Addison Wesley, 2004.


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COURSE OUTCOMES:

At the end of the course, the student will be able to

1. Review the literature of the research problem
2. Choose appropriate data collection and sampling method according to the research problem.
3. Interpret the results of research and communicate effectively with their peers
4. Explain the Importance of intellectual property rights
5. Evaluate trade mark, develop and register patents.

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak					
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	3	3
CO2	2	3	3	3	3
CO3	2	3	3	3	3
CO4	2	3	3	3	3
CO5	3	3	3	3	3

Course Assessment methods

Direct	Indirect
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory)	Assignment / Problem –Solving /Seminar (10) Total CIE: 40 Marks Semester End Examination : 60 Marks
	Course end survey

UNIT I INTRODUCTION TO RESEARCH METHODS

9

Definition and Objective of Research, Various steps in Scientific Research, Types of Research, Criteria for Good Research, Defining Research Problem, Research Design , Case Study Collection of Primary and Secondary Data, Collection Methods: Observation, Interview, Questionnaires, Schedules,

UNIT II SAMPLING DESIGN AND HYPOTHESIS TESTING

9

steps in Sampling Design, Types of Sample Designs, Measurements and Scaling Techniques -Testing of hypotheses concerning means (one mean and difference between two means -one tailed and two tailed tests), concerning variance — one tailed Chi-square test.

UNIT II INTERPRETATION AND REPORT WRITING

9

Techniques of Interpretation, Precaution in Interpretation, Layout of Research Report, Types of Reports, Oral Presentation, Mechanics of Writing Research Report

UNIT IV INTRODUCTION TO INTELLECTUAL PROPERTY

9

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights, Innovations and Inventions trade related intellectual property rights.

S. Padma
4.8.23

UNIT V TRADE MARKS, COPY RIGHTS AND PATENTS

9

Purpose and function of trade marks, acquisition of trade mark rights, trade mark registration processes, trademark claims —trademark Litigations- International trademark law Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

Lecture: 45, Tutorial: 0, Total: 45 Hours

TEXT BOOKS

1. C.R. Kothari, Gaurav Garg, Research Methodology Methods and Techniques An Edition, New Age International Publishers, 2019.
2. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets", Delmar Cengage Learning, 4" Edition, 2012.
3. Prabuddha Ganguli, "Intellectual Property Rights: Unleashing the Knowledge Economy", Tata Mc Graw Hill Education, 1" Edition, 2008.

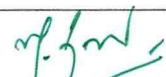
REFERENCE BOOKS

1. Panneerselvam, R., Research Methodology, Second Edition, Prentice-Hall of India, New Delhi, 2013.
2. Ranjith Kumar, Research Methodology — A step by step Guide for Begineers, 4" edition, Sage publisher, 2014.
3. D Llewelyn & T Aplin W Cornish, "Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights", Sweet and Maxwell, 1" Edition, 2016.
4. Ananth Padmanabhan, "Intellectual Property Rights-Infringement and Remedies", Lexis Nexis, 1" Edition, 2012.
5. Ramakrishna B and Anil Kumar H.S, "Fundamentals of Intellectual Property Rights: For Students, Industrialist and Patent Lawyers", Notion Press, 1" Edition, 2017.
6. M.Ashok Kumar and Mohd. Iqbal Ali : "Intellectual Property Rights" Serials Pub

S. Padma
4.8.23

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P23GE701	English for Research Paper Writing	L	T	P	J	C
		2	0	0	0	0
Course Outcomes						
At the end of the course, the student will be able to						
CO1:	Demonstrate research writing skills both for research articles and thesis					
CO2:	Frame suitable title and captions as sub-headings for articles and thesis					
CO3:	Write each section in a research paper and thesis coherently					
CO4:	Use language appropriately and proficiently for effective written communication					
CO5:	Exhibit professional proof-reading skills to make the writing error free					
Course Assessment methods						
Direct				Indirect		
CIE test I (30)		Total CIE: 100 marks		Course end survey		
CIE test II (30)		Semester End Examination: NIL				
CIE test III (40)						
Unit 01:					6 Hours	
Planning and preparation, word order, breaking up long sentences, organising ideas into paragraphs and sentences, being concise and avoiding redundancy, ambiguity and vagueness						
Unit 02:					6 Hours	
Interpreting research findings, understanding and avoiding plagiarism, paraphrasing sections of a paper/ abstract.						
Unit 03:					6 Hours	
Key skills to frame a title, to draft an abstract, to give an introduction						
Unit 04:					6 Hours	
Skills required to organise review of literature, methods, results, discussion and conclusions						
Unit 05:					6 Hours	
Usage of appropriate phrases and key terms to make the writing effective - proof-reading to ensure error-free writing						
Theory: 30 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs	
TEXT BOOKS						
1.	Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011					
2.	Highman N , Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book, 1998					
3.	Day R, How to Write and Publish a Scientific Paper, Cambridge University Press, 2006.					
4.	Goldbort R, Writing for Science, Yale University Press, 2006. (available on Google Books)					
REFERENCES						
1	Martin Cutts, Oxford Guide to Plain English, Oxford University Press, Second Edition, 2006					


HOD

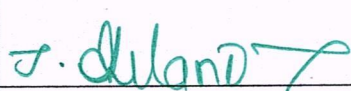
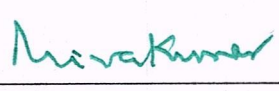
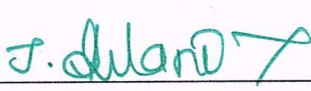
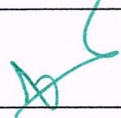
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Department of Humanities & Languages,
Sona College of Technology,
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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for M. Tech Semester II under Regulations 2023(CBCS)
Branch: M. Tech -Information Technology

S. No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type	
Theory Courses											
1	P23MIT201	Machine Learning	3	0	0	0	3	PC	45	T	
2	P23MIT202	Cyber Security	3	0	0	0	3	PC	45	T	
3	P23MIT203	Big Data Technologies	3	0	0	0	3	PC	45	T	
4	P23MIT501	Elective: Internet of Things	3	0	0	0	3	PE	45	T	
5	P23MIT518	Elective: Multimedia communication	3	0	0	0	3	PE	45	T	
6	P23GE702	Audit Course – Stress Management by Yoga	2	0	0	0	0	AC	30	T	
Practical Courses											
7	P23MIT204	Machine Learning Laboratory	0	0	4	2	3	PC	90	LP	
8	P23MIT205	Big Data Technologies Laboratory	0	0	4	0	2	PC	60	L	
Total Credits							20				

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

Approved By

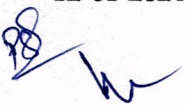
			
Chairperson, Information Technology BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.J.Akilandeswari	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/IT, Second Semester ,M. Tech Students, and Staff, COE

P23MIT201		MACHINE LEARNING				L	T	P	J	C
						3	0	0	0	3
Course Outcomes										
At the end of the course, the student will be able to										
CO1	Describe the concepts of different types of learning and apply linear regression for appropriate real world problems									
CO2	Demonstrate the concepts of logistic regression and implement the same.									
CO3	Explain and apply the concepts of Neural networks and support vector machines									
CO4	Evaluate the hypothesis based on factors like bias and variance									
CO5	Analyze the concepts of clustering, dimensionality reduction and anomaly detection.									
Pre-requisite: -										
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak										
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)									
	PO1	PO2	PO3	PSO1	PSO2					
CO1	3	1	3	2	3					
CO2	3	1	3	3	3					
CO3	3	1	3	3	3					
CO4	3	1	3	2	3					
CO5	3	1	3	3	3					
Course Assessment methods										
Direct					Indirect					
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60					Course end survey					
UNIT I	INTRODUCTION AND LINEAR REGRESSION							9 Hours		
What is machine learning? — Supervised Learning — unsupervised learning — Linear Regression — cost function — gradient descent algorithm — implementation - Gradient descent for multiple variables — feature scaling — learning rate — polynomial regression										
UNIT II	LOGISTIC REGRESSION							9 Hours		
Hypothesis representation — decision boundary — nonlinear decision boundaries — cost function — gradient descent — advanced optimizations — multi class classification problems— Regularization - Problem of overfitting — cost function optimization for regularization — regularized linear regression — regularized logistic regression										
UNIT III	NEURAL NETWORKS AND SUPPORT VECTOR MACHINES							9 Hours		
Overview and summary — neurons and brain — model representation — artificial neural networks representation — example — multiclass classification — cost function — back propagation algorithm — gradient checking — random initialization — Support vector machines — optimization objective — cost function — large margin intuition — decision boundary — kernels — adapting to nonlinear classifiers										
UNIT IV	ADVICE FOR APPLYING MACHINE LEARNING							9 Hours		
Debugging a learning algorithm — evaluating a hypothesis — model selection and training, validation test sets — bias Vs variance — regularization and bias/variance — learning curves machine learning system design										

UNIT V UNSUPERVISED ALGORITHMS				9 Hours
Unsupervised learning — k-means algorithm — optimization objective — choosing number of clusters - Dimensionality reduction — principle component analysis - Anomaly detection — algorithm — developing and evaluating the algorithm — anomaly detection Vs supervised algorithm -Case study — recommender system — collaborative filtering - Large scale machine learning — online learning — map reduce and parallelism.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
REFERENCES				
1.	Stanford's machine learning course presented by Professor Andrew Ng — online resource - http://www.holehouse.org/mlclass/			
2.	James, G., Witten, D., Hastie, T., Tibshirani, R, “An Introduction to Statistical Learning with Applications in R”, Springer, 2013.			
3.	Ethem Alpaydin, “Introduction to Machine Learning”, The MIT Press, 4th edition, 2020.			
4.	Christopher M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2016.			
5.	Sebastianraschka, “Python Machine Learning”, Packt Publishing Ltd., 3 rd Edition, 2019.			


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P23MIT202		CYBER SECURITY			L	T	P	J	C
					3	0	0	0	3
Course Outcomes									
At the end of the course, the student will be able to									
CO1	Describe the importance of cyber security and its essentials through various examples of cybercrimes in the world.								
CO2	Analyse possible vulnerabilities in e mail, web applications and operating systems the								
CO3	Describe spoofing and hijacking methods used in cybersecurity and its prevention.								
CO4	Apply the tools and methods used by cyber criminals and various techniques to protect against the cyber-attack.								
CO5	Apply the suitable tools and techniques for analysing and validating forensics data .								
Pre-requisite: -									
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak									
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)								
	PO1	PO2	PO3	PSO1	PSO2				
CO1	1	2	1	3	3				
CO2	3	3	3	3	3				
CO3	2	3	2	3	2				
CO4	3	2	1	3	2				
CO5	3	1	3	3	3				
Course Assessment methods									
Direct					Indirect				
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60					Course end survey				
UNIT I : INTRODUCTION								9 Hours	
Cyber Security Concepts- layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.									
UNIT II: VULNERABILITIES IN EMAIL AND WEB APPLICATIONS								9 Hours	
Mail Vulnerabilities – Major Mail Protocols: SMTP, POP, IMAP- Email attacks: List linking ,Email Bombing, Email Spamming, Email sniffing and Spoofing , 419s, phishing- Browser Based Vulnerabilities-Email security countermeasures. Web application vulnerabilities-Webserver Vulnerabilities- Weakness in administration tools, Weakness in application or Protocol design, Protection against web application Vulnerabilities.									
UNIT III: SPOOFING AND HIJACKING								9 Hours	
Spoofing –Process of IP Spoofing attack –Types of Spoofing : Blind Spoofing, Active Spoofing, IP Spoofing, ARP Spoofing, Web Spoofing, DNS Spoofing – Spoofing Tools : Mausezahn, Ettercap, ARPspoo – Prevention and Mitigation. Session Hijacking – TCP Session Hijacking –Session Hijacking Tool: Hunt- UDP Hijacking - Prevention and Mitigation									

UNIT IV: NETWORK SCANNING TOOLS				9 Hours
Introduction- Types of scanning- TCP connect scanning, Half open scanning, UDP scanning, IP scanning, Ping scanning, Stealth scanning – Scanning phases and Tools. Sniffers – Sniffers Types – Sniffer operation- Sniffer Programs: Wireshark, tcpdump, Snort, Network monitor, Cain and Abel- Detecting a sniffer- Protection against Sniffer.				
UNIT V: COMPUTER FORENSICS				9 Hours
Need for Computer Forensics - Cyberforensics and Digital Evidence - Forensics Analysis of E-Mail - Digital Forensics Life Cycle - Chain of Custody Concept - Network Forensics - Approaching a Computer Forensics Investigation - Setting up a Computer Forensics Laboratory: Understanding the Requirements - Computer Forensics and Steganography - Forensics and Social Networking Sites: The Security/Privacy Threats - Computer Forensics from Compliance Perspective - Challenges in Computer Forensics.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
REFERENCES				
1.	Cyber Security and Cyber Laws- Alfred Basta, Nadine Basta, Mary Brown, Ravinderkumar Cengage Publishers,2018			
2.	MarjieT.Britz, —"Computer Forensics and Cyber Crime: An Introduction", 3rd Edition, Prentice Hall, 2015.			
3.	Sagar Rahalkar, "Network Vulnerability Assessment", Birmingham, UK : Packt Publishing, 2018			
4.	Charles J. Brooks, Christopher Grow, Philip Craig, Donald Short "Cyber Security Essentials" Wiley India Publications, Oct 2019.			
5.	Nina Godbole, Sunit Belapur "Cyber Security"- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives –, Wiley India Publications Released: April 2015			


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P23MIT203	BIG DATA TECHNOLOGIES				L	T	P	J	C
					3	0	0	0	3
Course Outcomes									
At the end of the course, the student will be able to									
CO1	Explain the need and challenges of Big data and analytics.								
CO2	Apply and write jobs in Hadoop and map reduce framework and configure Hadoop eco systems and work with tools that are handling big data.								
CO3	Create NoSQL database and apply CRUD operations in MongoDB.								
CO4	Create database and apply CRUD operations in Cassandra and Hive.								
CO5	Write PigLatin scripts for database maintenance and Perform statistical based analysis and describe the data using various graphical methods.								
Pre-requisite: -									
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak									
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)								
	PO1	PO2	PO3	PSO1	PSO2				
CO1	1	2	2	1	1				
CO2	3	3	3	2	2				
CO3	2	2	2	3	1				
CO4	2	3	3	1	2				
CO5	2	3	3	1	2				
Course Assessment methods									
Direct					Indirect				
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60					Course end survey				
UNIT I : INTRODUCTION								9 Hours	
Types of Digital Data – Introduction to Big Data - Big Data Analytics - classification of Analytics - Greatest Challenges that Prevent Businesses from Capitalizing on Big Data - Top Challenges Facing Big Data - Why is Big Data Analytics Important? - Data Science - Terminologies Used in Big Data Environment - Few Top Analytics Tools									
UNIT II: TECHNOLOGIES, HADOOP AND MAP REDUCE								9 Hours	
The big data technology landscape – NoSQL – Hadoop - Introduction to Hadoop - RDBMS versus Hadoop - RDBMS versus Hadoop - Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Application with Hadoop YARN - Hadoop Ecosystem – Introduction to Map reduce Programming									
UNIT III: MONGODB								9 Hours	
Introduction to MongoDB - What is MongoDB? - Why MongoDB? - RDBMS and MongoDB - Data Types in MongoDB – MongoDB Query Language.									
UNIT IV: CASSANDRA AND HIVE								9 Hours	
Introduction to Cassandra -_Features of Cassandra - CQL Data Types – CQLSH – Keyspaces - CRUD – Collections – Alter - Import and Export – querying system tables Hive Architecture - Hive Data Types - Hive									

File Format - Hive Query Language- RCFile Implementation – SerDe – User Defined Functions

UNIT V: PIG AND RECENT TRENDS

9 Hours

Introduction to Pig - The Anatomy of Pig - Pig on Hadoop - Pig Latin Overview - Data Types - Running Pig - Execution Modes of Pig - HDFS Commands - Relational operators - Eval Function - Complex Data Type - User Defined Function - parameter Substitution - Diagnostic Operator - Word Count Example - When to use Pig? - When NOT to use Pig? - Pig versus Hive - Reporting tool – Trends – Case study

Theory: 45 Hrs

Tutorial: --


Practical: --

Project:--

Total Hours: 45 Hrs

REFERENCES

1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publication, first edition. Reprint in 2016.
2. DT Editorial Services, "Black Book- Big Data (Covers Hadoop 2, MapReduce, Hive, Yarn, PIG, R, Data visualization)", Dream tech Press edition 2016.
3. Radha Shankarmani, M Vijayalakshmi, "Big Data Analytics", Wiley Publications, First Edition 2016.
4. Chuck lam, "Hadoop in action", Dream tech Press-2016 reprint edition.
5. O'Reilly Media, Big Data now: Current Perspective from O'Reilly Media, 2013 Edition.


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P23MIT501	INTERNET OF THINGS				L	T	P	J	C
					3	0	0	0	3
Course Outcomes									
At the end of the course, the student will be able to									
CO1:	Explain the concept of IoT and identify the functions of different actuators and sensors.								
CO2:	Analyze various protocols for IoT								
CO3:	Design an IoT system using Raspberry Pi/Arduino								
CO4:	Implement web based services on IoT devices								
CO5:	Analyze applications of IoT in real time scenario								
Pre-requisite: No									
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak									
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)								
	PO1	PO2	PO3	PSO1	PSO2				
CO1	2	2	2	2	2				
CO2	3	3	3	3	3				
CO3	3	3	3	3	3				
CO4	3	3	3	3	3				
CO5	3	3	3	3	3				
Course Assessment methods									
Direct					Indirect				
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60					Course end survey				
UNIT I: FUNDAMENTALS OF IoT							9 Hours		
Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT models – Simplified IoT Architecture and Core IoT Functional Stack – Fog, Edge and Cloud in IoT – Functional blocks of an IoT ecosystem – Sensors, Actuators, Smart Objects and Connecting Smart Objects									
UNIT II: IoT PROTOCOLS							9 Hours		
IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – Network Layer: IP versions, Constrained Nodes and Constrained Networks – Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT									
UNIT III: DESIGN AND DEVELOPMENT							9 Hours		
Design Methodology – Embedded computing logic – Microcontroller, System on Chips – IoT system building blocks – Arduino – Board details, IDE programming – Raspberry Pi – Interfaces and Raspberry Pi with Python Programming									

UNIT IV: IoT PHYSICAL SERVERS AND CLOUD OFFERINGS				9 Hours
Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API				
UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS				9 Hours
Cisco IoT system – IBM Watson IoT platform – Manufacturing – Converged Plantwide Ethernet Model (CPwE) – Power Utility Industry – GridBlocks Reference Model – Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
REFERENCES				
1.	Arshdeep Bahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015			
2.	David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, —IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017			
3.	Olivier Hersent, David Boswarthick, Omar Elloumi , —The Internet of Things – Key applications and Protocols, Wiley, 2012 (for Unit 2).			
4.	Jan Ho" ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence", Elsevier, 2014.			
5.	Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011.			
6.	Michael Margolis, Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O'Reilly Media, 2011.			


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P23MIT518	MULTIMEDIA COMMUNICATION					L	T	P	J	C
						3	0	0	0	3
Course Outcomes										
At the end of the course, the student will be able to										
CO1	Explain the relevance and underlying infrastructure of the multimedia systems.									
CO2	Comprehend core multimedia audio and video compression techniques									
CO3	Apply the concepts of compression in different methods.									
CO4	Explain the voice over IP architecture and Quality of services.									
CO5	Explain the concepts of Multimedia networking applications.									
Pre-requisite: - Networking Fundamentals, Digital Communication and Signal Processing										
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak										
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)									
	PO1	PO2	PO3	PSO1	PSO2					
CO1	1	2	1	3	3					
CO2	3	3	3	3	3					
CO3	2	3	2	3	2					
CO4	3	2	1	3	2					
CO5	3	1	3	3	3					
Course Assessment methods										
Direct						Indirect				
CIE test I (10) , CIE test II (10), CIE test III (10), Assignment/Problem-solving/seminar (10) , Total CIE Marks: 40 Semester End Examination Marks: 60						Course end survey				
UNIT I: MULTIMEDIA COMPONENTS									9 Hours	
Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.										
UNIT II: AUDIO AND VIDEO COMPRESSION									9 Hours	
Audio compression–DPCM-Adaptive PCM –adaptive predictive coding-linear Predictive coding-code excited LPC-perpetual coding, MP3; Video compression – principles-H.261-H.263-MPEG 1, 2, 4.										
UNIT III: LOSSLESS COMPRESSION									9 Hours	
Compression principles-source encoders and destination encoders--entropy encoding –source encoding -text compression –static Huffman coding dynamic coding –arithmetic coding –Lempel Ziv-Welch Compression.										
UNIT IV: VoIP TECHNOLOGY									9 Hours	
Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service, CODEC Methods-VOIP applicability										


UNIT V: MULTIMEDIA NETWORKING	9 Hours
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Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications- integrated and differentiated Services-RSVP. Wireless Multimedia Networking- Challenges-Protocols-RTP,RTCP-Applications.

Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
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REFERENCES

1.	Tay Vaughan, "Multimedia: Making It Work",Tata Mc- Graw hill, New Delhi, Ninth edition,2019.
2.	Kurose and W.Ross, "Computer Networking –A top down approach" ,Pearson education, Seventh edition, 2017.
3.	Fred Halshall, "Multimedia communication - applications, networks, protocols and standards", Pearson education, 2009.
4.	Marcus Gonzalves, "Voice over IP Networks", McGraw Hill,1999.
5.	KR. Rao,Z S Bojkovic, D A Milovanovic, "Multimedia Communication Systems: Techniques, Standards, and Networks", Pearson Education 2017


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P23MIT204	MACHINE LEARNING LABORATORY	L	T	P	J	C
		0	0	4	2	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Apply data preprocessing and visualization techniques required for implementing ML algorithms
CO2:	Make use of Data sets in implementing machine learning algorithms
CO3:	Implement the machine learning concepts and algorithms

Pre-requisite: NIL

CO/PO, PSO Mapping
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PSO1	PSO2	
CO1		2	2		2	
CO2	2	3	3		3	
CO3	2	3	3		3	

Course Assessment methods

Direct	Indirect
CIE test I (10) Laboratory, Quiz-1 (5) CIE test II (10) – Laboratory ,Quiz-2 (5),CIE test III (10) Project, Record (10) Total CIE: 50 marks , Semester End Examination (50 Marks),SEE:Laboratory	Course end survey

LIST OF EXPERIMENTS

- Write a program to perform simple computations on the given dataset using numpy and pandas.
Sample Exercises:
Write a Python program to load the data from a given csv file into a dataframe and print the shape of the data, type of the data, first 3 rows, number of rows-columns, feature names and missing values.
Write a Python program to view basic statistical details like percentile, mean, std etc. of given dataset.
Write a Python program to access first four cells from a given Dataframe using the index and column labels.
- Write a program to visualize the data and features in the given dataset using matplotlib and pyplot.
Sample Exercise:
Write a Python program to create a plot to get a general Statistics of the given dataset. Draw box plot, joinplot, scatterplot, pairplot, kernel density estimate plot(using seaborn) to explore the frequency of data in the dataset.
- Write a program to implement simple linear regression to minimize the cost function.
Sample Exercise: In AB Company, there is a salary distribution table based on Year of experience.

You are a HR officer and you got a candidate with 5 years of experience. Plot the given data. and find the best salary to offer the candidate.

4. Write a program to implement multivariate linear regression.

Sample Exercise:

Consider a housing price data set with 2 variables (size of the house in square feet and number of bedrooms) and a target (price of the house). Write a program to normalize the features and predict the price of a new house (given the size and the number of bedrooms) by minimizing the cost function.

5. Build a logistic regression model to classify the data in the given dataset.

Sample Exercise: Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams. You have historical data from previous applicants that you can use as a training set. For each training example, you have the applicant's scores on two exams and the admissions decision. Write a program to build a classification model (logistic regression) that estimates the probability of admission based on the exam scores.

6. Write a program to fit a logistic regression model with regularization to avoid overfitting of the given dataset.
7. Write a program to implement a Neural Network model to classify the data in the given dataset.
8. Implement a ML model for the given datasets using Support Vector Machines(SVM).


Sample Exercise: Classify emails as spam or not spam using SVM classifier.

9. Load the given dataset, split it into train and test sets, then estimate the mean squared error (MSE) for a linear regression as well as the bias and variance for the model error over 100 bootstrap samples.
10. Apply K means algorithm to cluster a set of data stored in a .CSV file and plot the clusters.

Project:

Real time use cases will be provided to the students and students will carry out the project based on the use cases.

Theory: --	Tutorial: --	Practical: 60 Hrs	Project: -30	Total Hours: 90 Hrs
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P23MIT205	BIG DATA TECHNOLOGIES LABORATORY	L	T	P	J	C
		0	0	4	0	2

Course Outcomes

At the end of the course, the student will be able to

CO1:	Create applications for Big Data analytics.
CO2:	Apply data modelling techniques to large data sets.
CO3:	Prepare for data summarization, query, and analysis.

Pre-requisite: NIL

CO/PO, PSO Mapping
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PSO1	PSO2	
CO1		2	2	2	1	
CO2	2	3	3	1	2	
CO3	2	3	3	1	2	

Course Assessment methods

Direct		Indirect
CIE test I (20), Quiz-1 (5) CIE test II (20) ,Quiz-2 (5),RTPS (10) Total CIE: 60 marks , Semester End Examination: 40 Marks		Course end survey

LIST OF EXPERIMENTS

1. (i) Perform setting up and Installing Hadoop in its two operating modes:
 - Pseudo distributed,
 - Fully distributed.
 (ii) Use web based tools to monitor your Hadoop setup.
2. (i) Implement the following file management tasks in Hadoop:
 - Adding files and directories • Retrieving files • Deleting files
 ii) Benchmark and stress test an Apache Hadoop cluster
3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
 - Find the number of occurrence of each word appearing in the input file(s)
 - Performing a MapReduce Job for word search count (look for specific keywords in a file)
4. Stop word elimination problem:
 - Input: A large textual file containing one sentence per line
 A small file containing a set of stop words (One stop word per line)
 - Output:

A textual file containing the same sentences of the large input file without the words appearing in the small file.

5. Write a Map Reduce program that mines weather data.

Data available at: <https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all>.

- Find average, max and min temperature for each year in NCDC data set?
- Filter the readings of a set based on value of the measurement, Output the line of input files associated with a temperature value greater than 30.0 and store it in a separate file.

6. Purchases.txt Dataset

- Instead of breaking the sales down by store, give us a sales breakdown by product category across all of our stores
- What is the value of total sales for the following categories? ♣ Toys ♣ Consumer Electronics
- Find the monetary value for the highest individual sale for each separate store
- What are the values for the following stores? ♣ Reno ♣ Toledo ♣ Chandler
- Find the total sales value across all the stores, and the total number of sales.


7. Install and Run MongoDB then use MongoDB to create, alter, and drop databases, tables, views, functions, and indexes

8. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.


9. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg)

10. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

Theory: --	Tutorial: --	Practical: 60 Hrs	Project: --	Total Hours: 60 Hrs
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P23GE702	Stress Management by Yoga	L	T	P	J	C
		2	0	0	0	0
Course Outcomes						
At the end of the course, the student will be able to						
CO1:	Develop physical and mental health thus improving social health					
CO2:	Increase immunity power of the body and prevent diseases					
CO3:	Accelerate memory power					
CO4:	Achieve the set goal with confidence and determination					
CO5:	Improve stability of mind, pleasing personality and work with awakened wisdom					
Course Assessment methods						
Direct				Indirect		
CIE test I (30)	Total CIE: 100 marks		Course end survey			
CIE test II (30)	Semester End Examination: NIL					
CIE test III (40)						
Unit 01:					6 Hours	
Yoga-Introduction - Astanga Yoga- 8 parts-Yam and Niyam etc.- Do's and Don'ts in life-Benefits of Yoga and Asana- Yoga Exercise- and benefits- Pranayam Yoga- Nadi suthi, Practice and Spinal Sclearance Practice-Regularization of breathing techniques and its effects-Practice and kapalapathy practice.						
Unit 02:					6 Hours	
Neuromuscular breathing exercise and Practice- Magarasa Yoga, 14 points Acupressure techniques and practice-Body relaxation practice and its benefits- Raja Yoga- 1.Agna –explanation and practice- Activation of Pituitary- Raja Yoga- 2. Santhi Yoga-Practice-Balancing of physical and mental power.						
Unit 03:					6 Hours	
Raja Yoga- 3. Sagasrathara yoga –practice- Activation of dormant brain cells-Kayakalpa-theory- Kayakalpa –practice-Yogic exercise to improve physical and mental health and practice-Asanas –explanation-Practice-benefits						
Unit 04:					6 Hours	
Sun namaskar- 12 poses-explanation and practice-Yoga –Asana-Padmasana, vajrasana,chakrasana, viruchasana etc-Stress management with Yoga-Role of women and Yoga Equality, nonviolence, Humanity, Self- control- Food and yoga Aware of self-destructive habits Avoid fault thinking (thought analysis-Practice)-Yoga Free from ANGER (Neutralization of anger)& practice						
Unit 05:					6 Hours	
Moralisation of Desire & practice- Punctuality-Love-Kindness-Compassion Eradication of worries-Practice - Personality development, positive thinking-Good characters to lead a moral life How to clear the polluted mind- Benefits of blessing- Five- fold culture –explanation- Karma Yoga Practice In Geetha- Sense of duty-Devotion, self- reliance, confidence, concentration, truthfulness, cleanliness.						
Theory: 30 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs	
REFERENCES						
1	‘Yogic Asanas for Group Tarining-Part-I’ Janardan Swami Yogabhyasi Mandal, Nagpur					
2	“Rajayoga or conquering the Internal Nature” by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata					


HOD
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